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WATER QUALITY OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN

MONITORING REPORT #5

October 1, 1990 – June 30, 1991

SUSQUEHANNA RIVER BASIN COMMISSION

AUGUST 1992

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The Susquehanna River Basin Commission was created as an independent agency by a Federal-Interstate Compact* among the States of Maryland, New York, Commonwealth of Pennsylvania and the Federal Government. In creating the Commission, the Congress and State Legislatures formally recognized the water resources of the Susquehanna River basin as a regional asset vested with local, State and National interests for which all the parties share responsibility. As the single Federal-Interstate water resources agency with basinwide authority, the Commission's goal is to effect coordinated planning, conservation, management, utilization, development and control of basin water resources among the government and private sectors.

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* Statutory Citations: Federal - Pub. L. 91-575, 84 Stat. 1509 (December, 1970); Maryland - Natural Resources Sec. 8-301 (Michie 1974); New York - ECL Sec. 21-1301 (McKinney 1973); and Pennsylvania - 32 P.S. 820.1 (Supp. 1976).

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Water quality of interstate streams in the Susquehanna

WATER QUALITY OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN

MONITORING REPORT #5

October 1, 1990 - June 30, 1991

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Prepared by

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Resources Quality Management & Protection Division

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ABSTRACT

Water samples were collected from 15 stations on interstate streams between October 1, 1990, and June 30, 1991. Samples were collected every other month from streams judged to have a high potential for degradation. The data collected are used to: 1) assess compliance with water-quality standards; 2) assess impacts on water quality; 3) characterize ambient and seasonal stream quality; and 4) assess future trends.

Scott Creek is the only interstate stream having poor water quality. Untreated sewage discharges from Cardiff, Md., impairs water quality. Cayuta Creek, the Chemung River, and the Susquehanna River at Sayre, Pa., have elevated chemical concentrations due to waste water discharges. Acid mine drainage to the Tioga River contributes to elevated metals concentrations. Conowingo Creek has elevated nutrient concentrations due to agricultural runoff in the basin. Most interstate streams have good water quality. Only 29 of the 1,298 analyses exceeded water-quality standards. Iron most commonly exceeded standards.

INTRODUCTION

The Susquehanna River Basin Commission (SRBC) reviews projects and policies for potential impacts on interstate water resources in the Susquehanna River basin. Current water-quality data are needed to conduct these reviews. However, monitoring programs conducted by New York, Pennsylvania, and Maryland do not cover all of the interstate streams and do not produce comparable data. Thus, SRBC established a monitoring program to collect data needed to assess potential impacts on the water quality of interstate streams. This ongoing program is partially funded through a grant from the Environmental Protection Agency.

The monitoring program includes periodic collection of water and biological samples from interstate streams. Chemical data are used to: 1) assess compliance with state water-quality standards; 2) characterize stream quality and seasonal variations; and 3) build a data base for the future assessment of water-quality trends.

Monitoring began in April 1986. In the past, results have been reported for Water Years (WY) that run from October through September (McMorran, 1988; McMorran and Bollinger, 1989; McMorran and Bollinger, 1990; and Bollinger, 1991) This report covers the interim period from October 1, 1990, to June 30, 1991. The next report will be presented on the SRBC fiscal-year basis that covers the period from July 1, 1991, to June 30, 1992. In the future, monitoring data will be reported on a fiscal-year basis.

BASIN GEOGRAPHY

The Susquehanna River basin is the largest river basin on the Atlantic Coast of the United States, draining 27,580 square miles (figure 1). The Susquehanna River originates at the outlet of Otsego Lake, Cooperstown, N.Y., and flows 450 miles through New York, Pennsylvania, and Maryland to the Chesapeake Bay at Havre de Grace, Md. Eighty-three streams cross state lines in the basin (table 1). Some streams flow across state lines at several places, contributing to a total of 91 crossings. At 45 of these locations, streams flow from New York into Pennsylvania. Twenty-two reaches cross from Pennsylvania into New York, 15 from Pennsylvania into Maryland, and nine from Maryland into Pennsylvania. Many streams are small; 32 are unnamed.

METHODS

Sampling frequency

In Water Year 1989, the interstate streams were divided into the following three groups according to the degree of water-quality impairment and potential for degradation.

Group 1 stations were on streams with impaired water quality or where a high potential for degradation was judged to exist. Water samples were collected from these stations every other month with the exception of the months of January and February. Sampling was alternated so that streams along the New York/Pennsylvania border were sampled one month (November, March, and May) and streams along the Pennsylvania/Maryland border were collected the following month (October, December, April, and June). Macroinvertebrates were not collected at Group 1 stations during the interim period presented in this report.

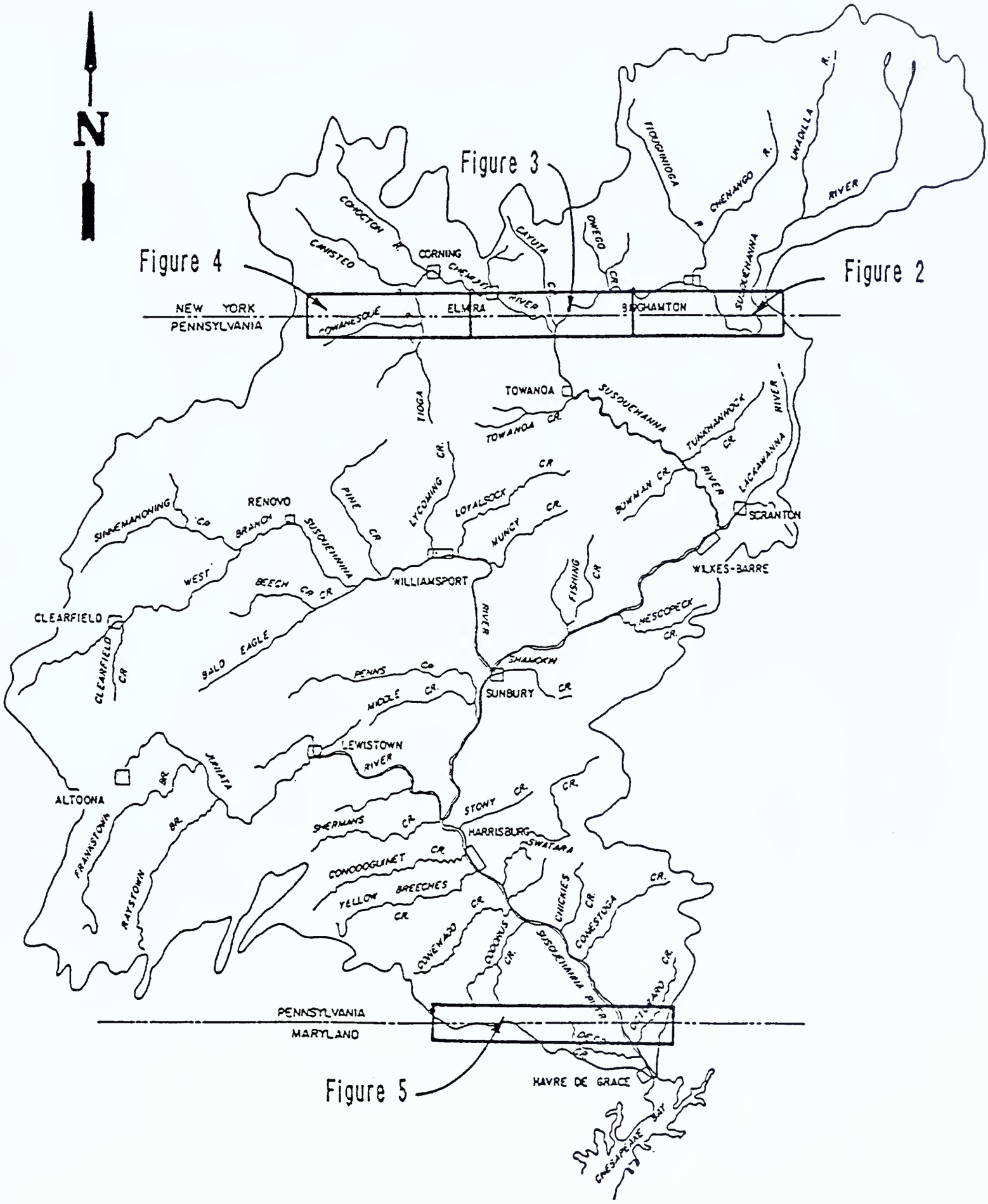


FIGURE 1.--Map showing the Susquehanna River basin

TABLE 1.--Interstate streams in the Susquehanna River basin

Streams between New York and Pennsylvania	Monitoring group	Flow direction (from -> to)
Apalachin Creek	2	Pa.->N.Y.
Babcock Run	3	N.Y.->Pa.
Bentley Creek	2	Pa.->N.Y.
Bill Hess Creek	3	N.Y.->Pa.
Bird Creek	3	Pa.->N.Y.
Biscuit Hollow	3	N.Y.->Pa.
Briggs Hollow Run	3	N.Y.->Pa.
Bulkley Brook	3	N.Y.->Pa.
Camp Brook	3	N.Y.->Pa.
Cascade Creek	2	N.Y.->Pa.
Cayuta Creek	1	N.Y.->Pa.
Chemung River	1	N.Y.->Pa.->N.Y.->Pa.
Choconut Creek	2	Pa.->N.Y.
Cook Hollow	3	N.Y.->Pa.
Cowanesque River	1	Pa.->N.Y.
Deep Hollow Brook	3	N.Y.->Pa.
Denton Creek	3	N.Y.->Pa.
Dry Brook	3	N.Y.->Pa.
Holden Creek	2	N.Y.->Pa.
Little Snake Creek	2	Pa.->N.Y.
Little Wappasening Creek	3	Pa.->N.Y.
North Fork Cowanesque River	2	N.Y.->Pa.
Parks Creek	3	Pa.->N.Y.
Prince Hollow Run	3	N.Y.->Pa.

TABLE 1.--Interstate streams in the Susquehanna River basin--Continued

Streams between New York and Pennsylvania	Monitoring group	Flow direction (from -> to)
Red House/Beagle Hollow	3	N.Y.->Pa.
Russell Run	3	N.Y.->Pa.
Sackett Creek	3	Pa.->N.Y.
Seeley Creek	2	Pa.->N.Y.
South Creek	2	Pa.->N.Y.
Snake Creek	2	Pa.->N.Y.
Strait Creek	3	N.Y.->Pa.
Susquehanna River	1	N.Y.->Pa.->N.Y.->Pa.
Tioga River	1	Pa.->N.Y.
Troups Creek	1	N.Y.->Pa.
Trowbridge Creek	2	N.Y.->Pa.
Wappasening Creek	2	Pa.->N.Y.
White Branch	3	N.Y.->Pa.
White Hollow	3	Pa.->N.Y.
17 Unnamed tributaries	3	N.Y.->Pa.
2 Unnamed tributaries	3	Pa.->N.Y.
2 Unnamed tributaries	3	Pa.->N.Y.->Pa.
1 Unnamed tributary	3	N.Y.->Pa.->N.Y.

TABLE 1.--Interstate streams in the Susquehanna River basin--Continued

Streams between Pennsylvania and Maryland	Monitoring group	Flow direction (from -> to)
Big Branch Deer Creek	2	Pa.->Md.
Conowingo Creek	1	Pa.->Md.
Deer Creek	1	Pa.->Md.
Ebaughs Creek	1	Pa.->Md.
Falling Branch Deer Creek	2	Pa.->Md.
Island Branch	3	Pa.->Md.
Long Arm Creek	2	Md.->Pa.
Octoraro Creek	1	Pa.->Md.
Scott Creek	1	Md.->Pa.
South Branch Conewago Creek	2	Md.->Pa.
Susquehanna River	1	Pa.->Md.
6 Unnamed tributaries	3	Md.->Pa.
7 Unnamed tributaries	3	Pa.->Md.

Group 2 stations were on streams judged to have moderate potential for impacts. Water quality and macroinvertebrate samples from Group 2 stations were not obtained during this interim period.

Group 3 streams were judged to have a low potential for impacts. Consequently, they were not sampled, but were visually inspected for signs of degradation.

The stream stations sampled during the interim period are listed in tables 2 and 3 and are shown on figures 2 through 5.

Stream discharge.

Stream discharge was measured at all stations unless high stream flows made access impossible. Several stations are located near United States Geological Survey (USGS) stream gages. These stations include: the Susquehanna River at Windsor, N.Y., Kirkwood, N.Y., Sayre, Pa., Marietta, Pa., and Conowingo, Md.; the Chemung River at Chemung, N.Y.; the Tioga River at Lindley, N.Y.; and the Cowanesque River at Lawrenceville, Pa. Stream discharges from USGS gaging stations are reported as instantaneous discharges in cubic feet per second (cfs). At stations that are not located near gaging stations, instantaneous discharge was measured at the time of sampling using standard USGS procedures.

Water samples

Water samples were collected at each of the sites to measure nutrient and metal concentrations. The chemical and physical parameters are listed in table 4. Water samples were collected using a depth-integrating sampler.

TABLE 2.--Stream stations sampled along the New York/Pennsylvania border and the sampling rationale

Station	Stream and location	Monitoring group	Rationale
SUSQ 365.0	Susquehanna River Windsor, N.Y.	1	Large drainage area (1,882 sq. mi.); municipal discharges from Cooperstown, Sidney, Bainbridge, and Oneonta.
SUSQ 340.0	Susquehanna River Kirkwood, N.Y.	1	Large drainage area (2,232 sq. mi.); historical pollution due to sewage from Lanesboro, Oakland, Susquehanna, Great Bend, and Hallstead.
CAYT 1.7	Cayuta Creek Waverly, N.Y.	1	Municipal discharge from Waverly.
TRUP 4.5	Troups Creek Austinburg, Pa.	1	High turbidity and moderately impaired macroinvertebrate populations.
COWN 2.2	Cowanesque River Lawrenceville, Pa.	1	Impacts from flood control reservoir.
TIOG 10.8	Tioga River Lindley, N.Y.	1	Pollution from acid mine discharges and impacts from flood control reservoirs.
CHEM 12.0	Chemung River Chemung, N.Y.	1	Municipal and industrial discharges from Elmira.
SUSQ 289.1	Susquehanna River Sayre, Pa.	1	Large drainage area (4,933 sq. mi.); municipal and industrial discharges.

TABLE 3.--Stream stations sampled along the Pennsylvania/Maryland border and the sampling rationale

Station		Stream and location	Monitoring group	Rationale
SUSQ	44.5	Susquehanna River Marietta, Pa.	1	Bracket hydroelectric dams near the state line.
SCTT	3.0	Scott Creek Delta, Pa.	1	Pollution from untreated sewage.
CNWG	4.4	Conowingo Creek Pleasant Grove, Pa.	1	High nutrient loads and other agricultural runoff. Nonpoint runoff to Chesapeake Bay.
OCTO	6.6	Octoraro Creek Rising Sun, Md.	1	High nutrient loads due to agricultural runoff from New Bridge, Md. Water-quality impacts from Octoraro Lake. Nonpoint runoff to Chesapeake Bay.
EBAU	1.5	Ebaughs Creek Stewartstown, Pa.	1	Municipal discharge from Stewartstown. Nonpoint runoff to Chesapeake Bay.
DEER	44.5	Deer Creek Gorsuch Mills, Md.	1	Past pollution from Gorsuch Mills, Md., and Stewartstown, Pa. Nonpoint runoff to Chesapeake Bay.
SUSQ	10.0	Susquehanna River Conowingo, Md.	1	Bracket hydroelectric dams near state line.

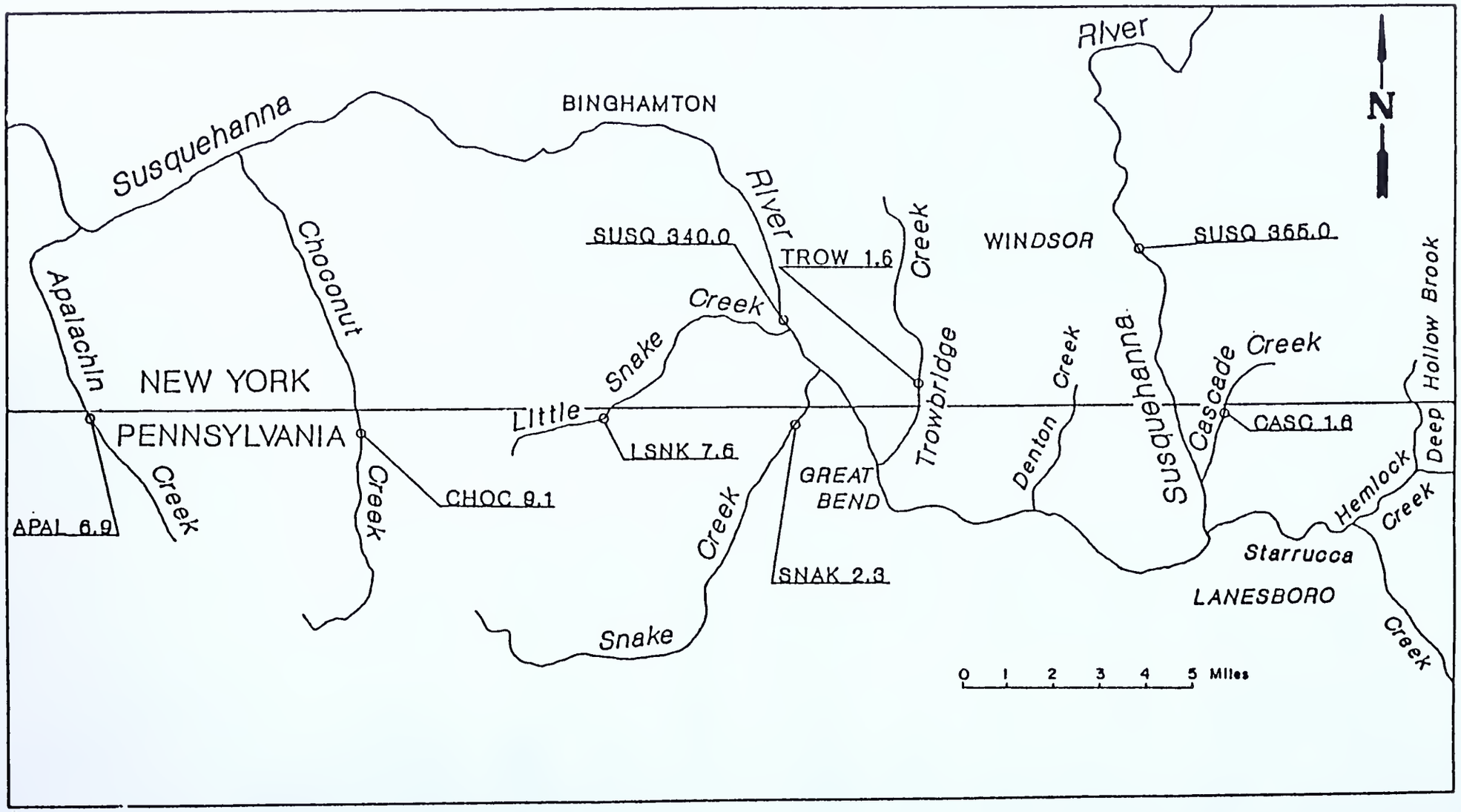


FIGURE 2.--Interstate streams along the New York/Pennsylvania border between Cascade Creek and Apalachin Creek

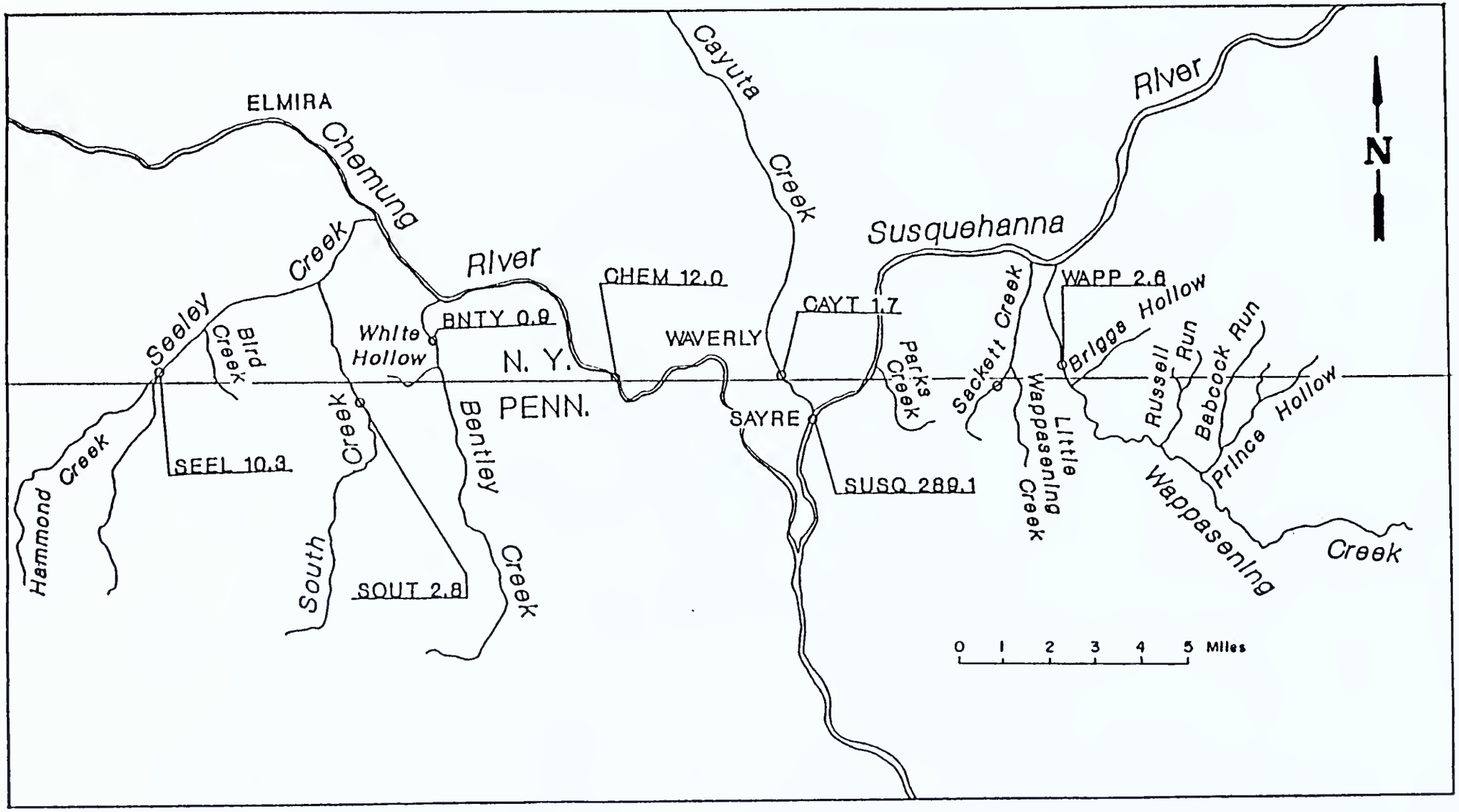


FIGURE 3.--Interstate streams along the New York/Pennsylvania border between Seeley Creek and Wappasening Creek

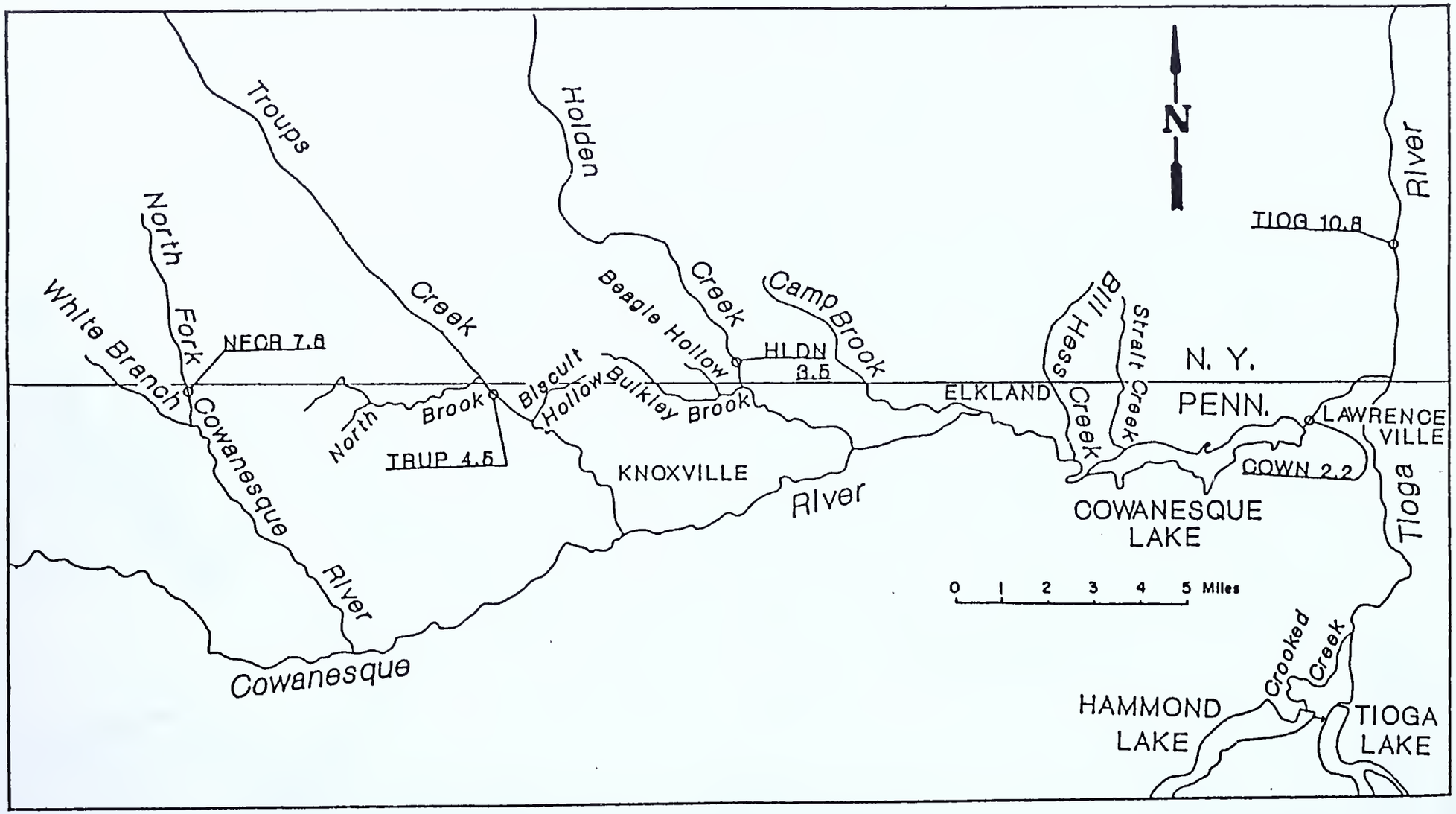


FIGURE 4.--Interstate streams along the New York/Pennsylvania border between North Fork Cowanesque River and Tioga River

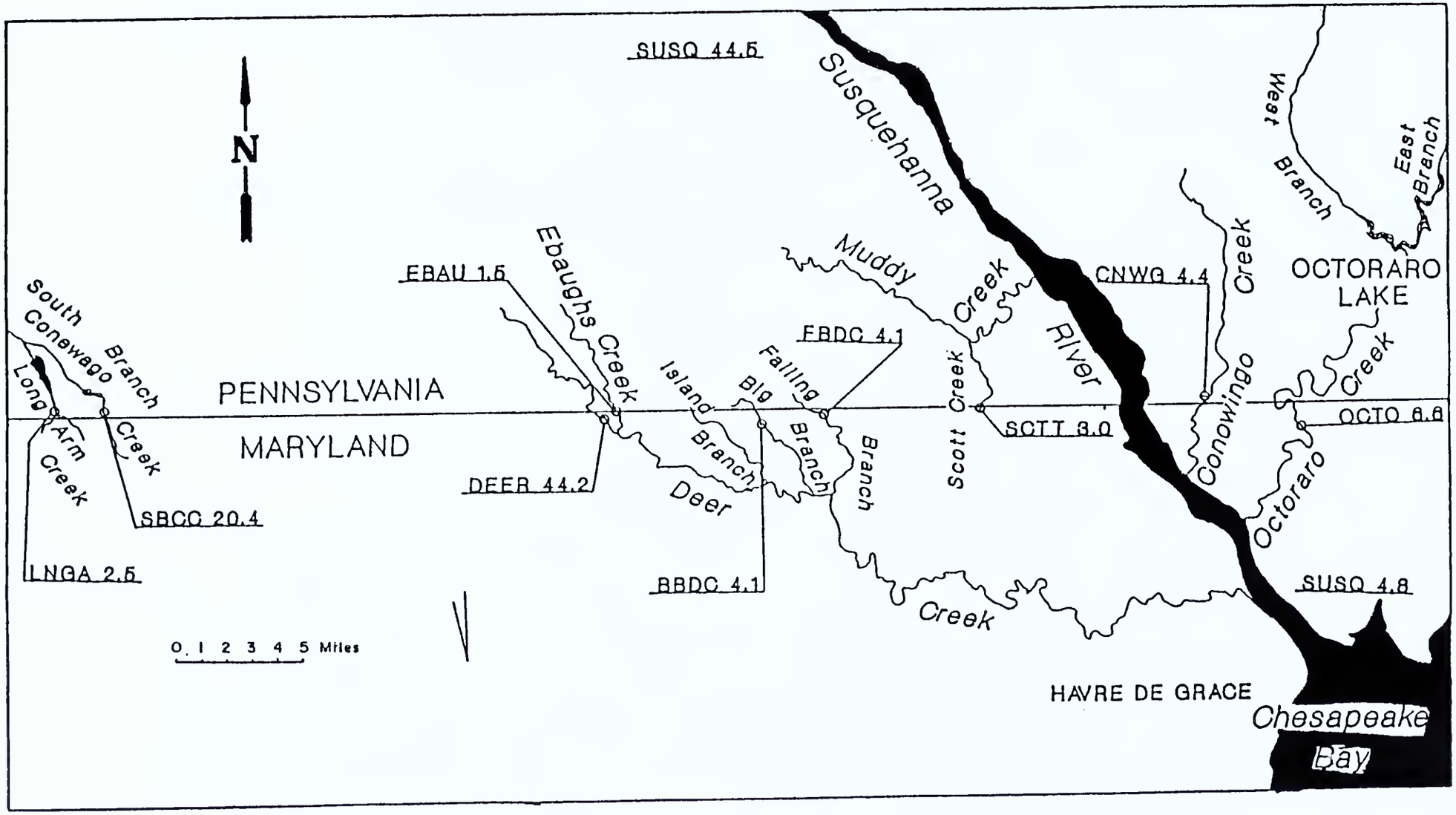


FIGURE 5.--Interstate streams along the Pennsylvania/Maryland border

TABLE 4.--Monitored parameters

Parameter	STORET Code
Physical Parameters	
Discharge	00060
Temperature	00010
Chemical Parameters	
Field Analyses	
Conductivity	00095
Dissolved Oxygen	00300
pH	00400
Alkalinity	00410
Acidity	00435
Free chlorine	50064
Laboratory Analyses	
Biochemical Oxygen Demand	00310
Solids - Dissolved	00515
Total	00500
Ammonia as Nitrogen - Dissolved	00608
Total	00610
Nitrite as Nitrogen - Dissolved	00613
Total	00615
Nitrate as Nitrogen - Dissolved	00618
Total	00620
Kjeldahl Nitrogen - Dissolved	00623
Total	00625
Phosphorus - Dissolved	00666
Total	00665
Orthophosphate - Dissolved	00671
Total	70507
Organic Carbon - Total	00680
Magnesium - Total	00927
Chloride - Total	00940
Sulfate - Total	00945
Iron - Dissolved	01046
Total	01045
Manganese - Dissolved	01056
Total	01055
Aluminum - Dissolved	01106
Total	01105
Turbidity	82079

Composite samples were obtained by collecting eight depth-integrated samples across the stream channel and combining them in a churn splitter, which was previously rinsed with distilled water. Sample water was thoroughly mixed in the churn splitter and collected for nutrient analysis in two 500 ml bottles, one filtered and one raw. Samples for metals analysis were collected in two acid-rinsed 500 ml bottles, one filtered and one raw sample. Samples to be used for metals analysis were fixed with 2.0 ml of concentrated nitric acid (HNO_3). A cellulose nitrate filter with 0.45 micrometer pore size was used to obtain the filtrate for laboratory analysis. New filter paper was used at each station. The samples were chilled on ice and sent to the Pennsylvania Department of Environmental Resources (Pa. DER), Bureau of Laboratories in Harrisburg, Pa.

Field chemistry

Temperature, dissolved oxygen, conductivity, pH, alkalinity, acidity, and chlorine were measured in the field. Temperature and dissolved oxygen were measured using a YSI, Model 54A, dissolved oxygen meter. The dissolved oxygen meter was calibrated at the beginning of each day that water samples were collected. A Beckman solu-bridge conductivity meter was used to measure conductivity. An Orion, Model 399A, meter was used to measure pH. The pH meter was calibrated at the beginning of each day and randomly checked during the day. Alkalinity was determined by titrating a known volume of sample water to pH 4.5 with 0.02 normal sulfuric acid ($H2SO_4$). Acidity was measured by titrating a known volume of sample water to pH 8.3 with 0.02 normal sodium hydroxide (NaOH). Total free chlorine was measured using a Lamotte 4497-DR, Model PC7-DR, chlorine test kit.

Data synthesis

Results of laboratory analyses for chemical parameters were compared with state water-quality standards. In addition, a simple Water-Quality Index (WQI) was calculated, using procedures established by McMorran (1989). The WQI was used to make comparisons between sampling periods and stations within the same geographical region; therefore, the water-quality data were separated into two groups. One group contained stations along the New York/Pennsylvania border and the other group contained stations along the Pennsylvania/Maryland border. The data in each group were sorted by parameter and ranked by increasing order of magnitude. The rank of each chemical analysis was divided by the total number of observations in the group to obtain a percentile. The WQI score was calculated by averaging all the percentile ranks for each sample.

RESULTS

The water quality in most interstate streams continues to meet designated use classes and water-quality standards. The parameters that most frequently exceeded water-quality standards were total iron and total aluminum (table 5, figure 6). Dissolved oxygen exceeded standards on one occasion. Only 29 out of 1,298 observations exceeded water-quality standards.

New York/Pennsylvania border streams

High Water-Quality Index (WQI) values for Cayuta Creek indicate that wastewater discharges from Waverly, N.Y., are contributing to elevated nutrient concentrations. All water-quality observations met standards.

TABLE 5.--Water-quality standards

Parameter	Number of observations	Number exceeding standard	Standard
Total aluminum	52	9	Pa. chronic fish criteria
Total iron	52	13	N.Y. health (water source)
		3	Pa. chronic fish criteria
Dissolved iron	52	2	Pa. chronic human health
		1	Pa. chronic fish criteria
Dissolved oxygen	44	1	Md./Pa.

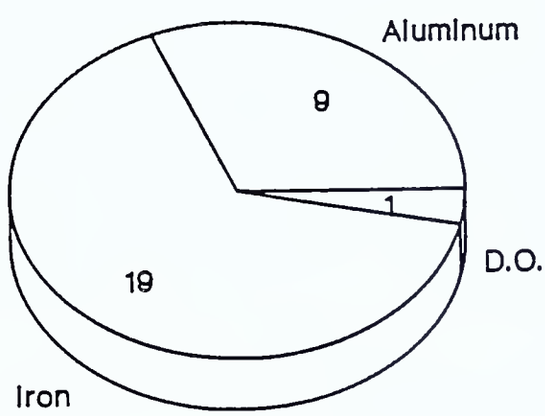


FIGURE 6.--Number of observations exceeding water-quality standards

The Chemung River continues to have elevated nutrient concentrations and high WQI values due to wastewater discharges from the city of Elmira, N.Y. Total iron exceeded standards on two occasions.

Elevated iron and aluminum concentrations in the Cowanesque River contribute to high WQI values. Standards for total iron were exceeded in four observations and standards for total aluminum were exceeded on one occasion. Chemical data indicate that overall water quality in the Cowanesque River is good.

Acid mine drainage in the headwaters of the Tioga River contributes to poor water quality downstream to the Tioga-Hammond Reservoir. Water quality improves significantly below the Tioga-Hammond Reservoir; however, some impacts from the acid mine drainage may still be detected in the river. High WQI values indicate elevated sulfate and metals concentrations. Total iron and total aluminum each exceeded standards on two occasions.

The Susquehanna River at Sayre, Pa., is affected by waste water discharges from the City of Binghamton, N.Y. The discharges contribute to elevated nutrient concentrations and high WQI values. Total iron exceeded standards in two observations and total aluminum exceeded standards in one observation.

Pennsylvania/Maryland border streams

Conowingo Creek continues to have elevated nutrient concentrations and high WQI values. The Conowingo Creek basin is dominated by agricultural land which may result in some nutrient enrichment in the stream. Total and

dissolved nitrate concentrations were high throughout the sampling period. Total iron exceeded standards on one occasion and total aluminum exceeded standards on two occasions.

Scott Creek at Delta, Pa., continues to be degraded by raw sewage discharges from Cardiff, Md. Concentrations of the chemical parameters were high in every sample, including five observations that exceeded water-quality standards. Total iron exceeded standards on four occasions and dissolved oxygen exceeded standards on one occasion. Water-Quality Index values were extremely high especially during periods of low flow. High stream flows and runoff events appear to dilute the pollutants resulting in lower Water-Quality Index values. All Water-Quality Index values were much higher than those for most other streams.

Station summaries are presented in tables 6 through 20. Included are listings of parameters exceeding water-quality standards, WQI values and parameters that exceeded the 90th percentile at each station. Graphs are provided showing historical comparisons for water quality over the monitoring period.

Abbreviations for tables 6 through 20

Abbrev.	Parameter		Abbrev.	Parameter	
ALK	Alkalinity		TAl	Total	Aluminum
BOD	Biochemical O_2 Demand		TCl	"	Chloride
COND	Conductivity		TFe	"	Iron
DAl	Dissolved Alumunim		TKN	"	Kjeldahl N
DFe	"	Iron	TMg	"	Magnesium
DKN	"	Kjeldahl N	TMn	"	Manganese
DMn	"	Manganese	TNH_3	"	Ammonia
DNH_3	"	Ammonia	TNO_2	"	Nitrite
DNO_2	"	Nitrite	TNO_3	"	Nitrate
DNO_3	"	Nitrate	TP	"	Phosphorus
DO	"	Oxygen	TPO_4	"	Orthophosphate
DP	"	Phosphorus	TS	"	Solids
DPO_4	"	Orthophosphate	TSO_4	"	Sulfate
DS	"	Solids	TOC	"	Org. Carbon
			TURB	"	Turbidity

WQI Water-Quality Index

TABLE 6.--Water-quality summary Susquehanna River at Windsor, N.Y.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	11/13/90	1,470 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TAl	11/13/90	913 ug/l	500 ug/l	Pa. chronic fish criteria
TFe	05/21/91	387 ug/l	300 ug/l	N.Y. health (water source) and aquatic

Date	WQ Index	Parameters exceeding 90th percentile
11/13/90	44	DKN, TKN
03/18/91	45	DNO_3, TNO_3
05/21/91	34	

Water-Quality Index

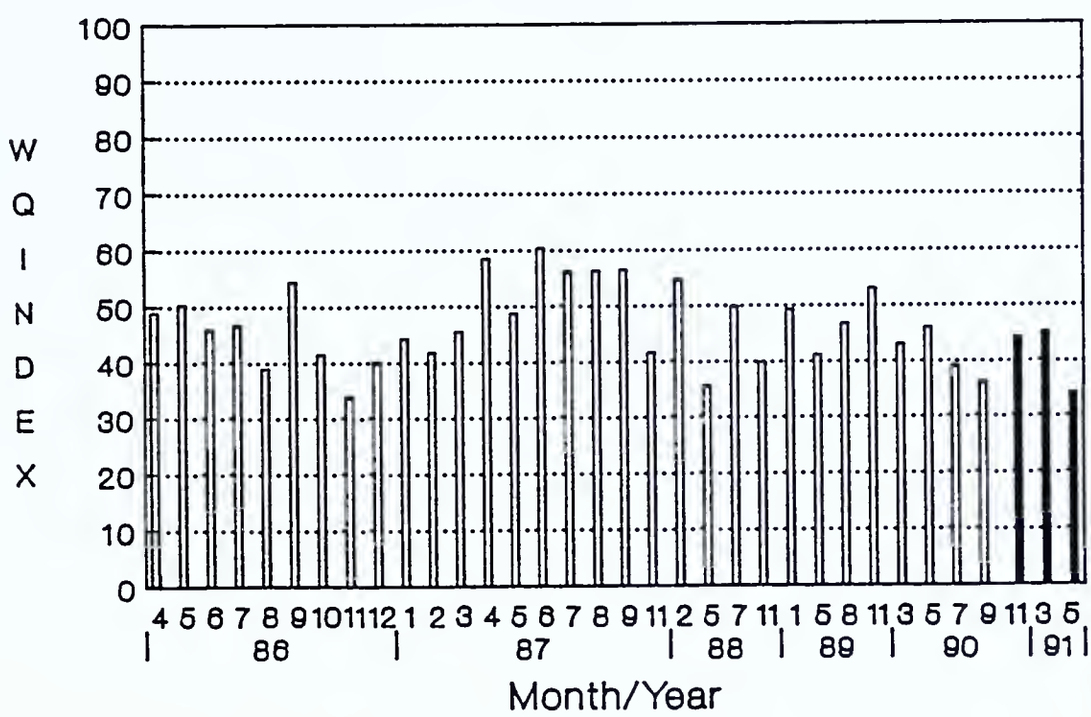


TABLE 7.--Water-quality summary Susquehanna River at Kirkwood, N.Y.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	11/13/90	586 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TFe	03/18/91	307 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TFe	05/21/91	375 ug/l	300 ug/l	N.Y. health (water source) and aquatic

Date	WQ Index	Parameters exceeding 90th percentile
11/13/90	44	TKN, TP, TOC, DFe
03/18/91	38	
05/21/91	35	TSO_4

Water-Quality Index

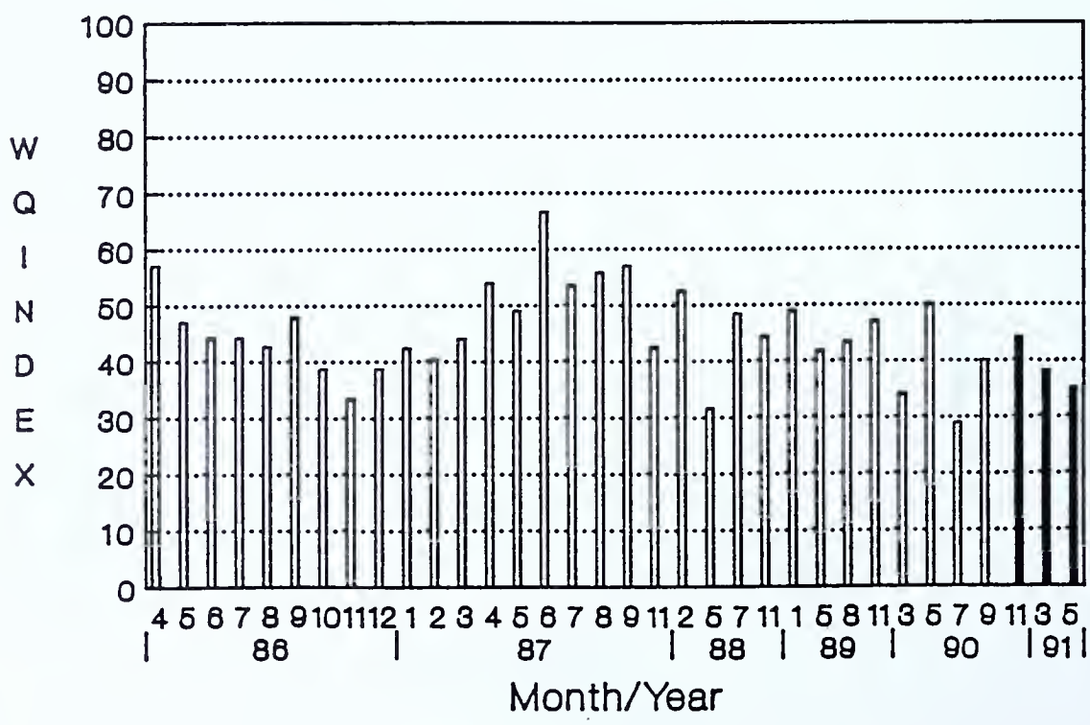


TABLE 8.--Water-quality summary Cayuta Creek at Waverly, N.Y.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters exceeding 90th percentile
11/14/90	36	
03/18/91	42	TS, DS
05/21/91	60	TS, DS, TNH_3, DNH_3, DNO_2, TP, DP, DPO_4, TMg, TCl, ALK

Water-Quality Index

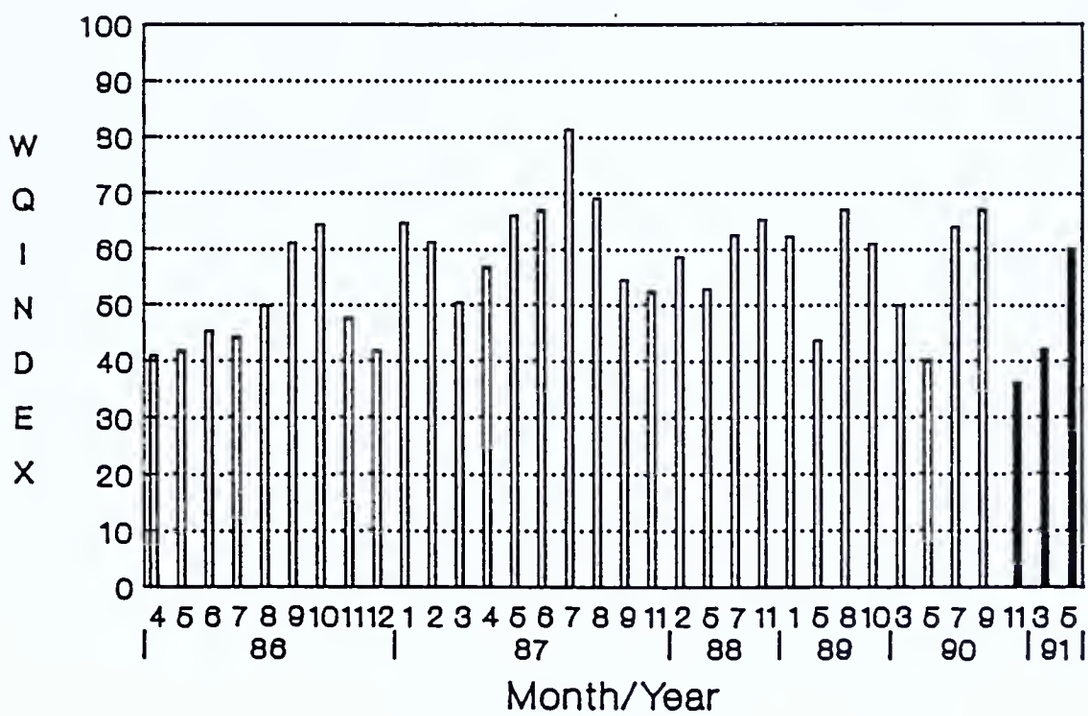


TABLE 9.--Water-quality summary Troups Creek at Austinburg, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	03/20/91	2,200 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TFe	03/20/91	2,200 ug/l	300 ug/l	Pa. chronic fish criteria
TAl	03/20/91	2,530 ug/l	2,500 ug/l	Pa. acute fish criteria
TAl	03/20/91	2,530 ug/l	500 ug/l	Pa. chronic fish criteria

Date	WQ Index	Parameters exceeding 90th percentile
11/15/90	35	
03/20/91	46	TFe, TAl, TURB
05/22/91	45	BOD, DNH_3, DKN, TMg, ALK

Water-Quality Index

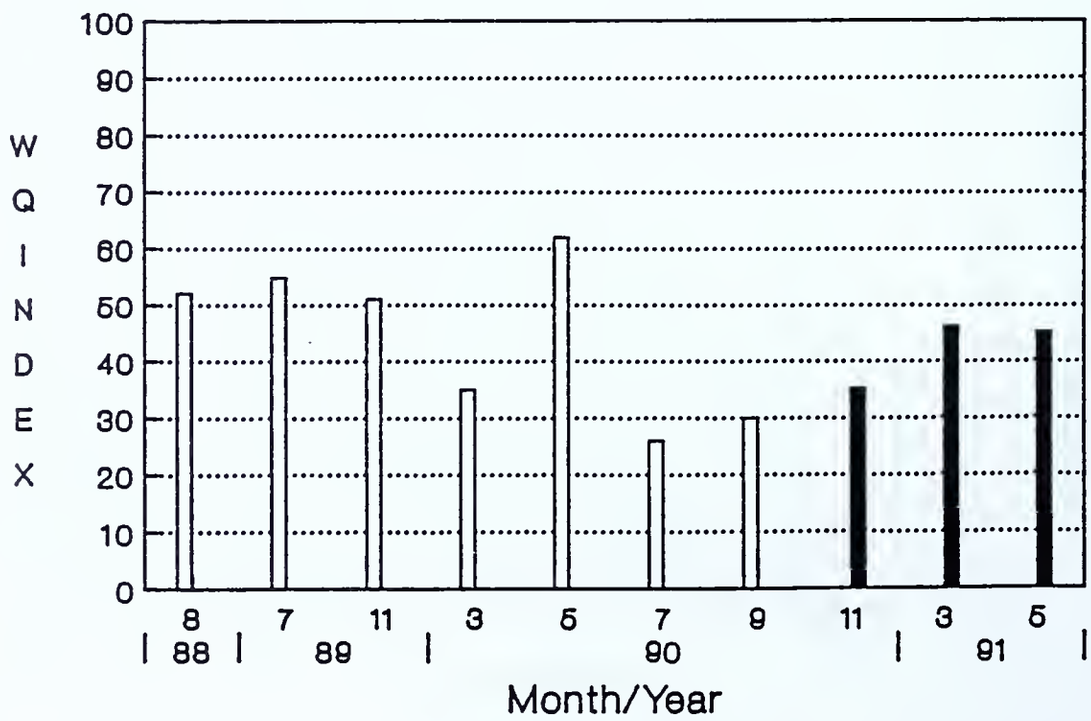


TABLE 10.--Water-quality summary Cowanesque River at Lawrenceville, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	11/14/90	808 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TAl	11/14/90	607 ug/l	500 ug/l	Pa. chronic fish criteria
TFe	03/19/91	2,020 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TFe	03/19/91	2,020 ug/l	1,500 ug//l	Pa. chronic fish criteria
TAl	03/19/91	2,490 ug/l	500 ug/l	Pa. chronic fish criteria

Date	WQ Index	Parameters exceeding 90th percentile
11/14/90	67	TNO_2, TOC, DFe
03/19/91	62	TFe, TAl, TPO_4, TURB
05/22/91	33	

Water-Quality Index

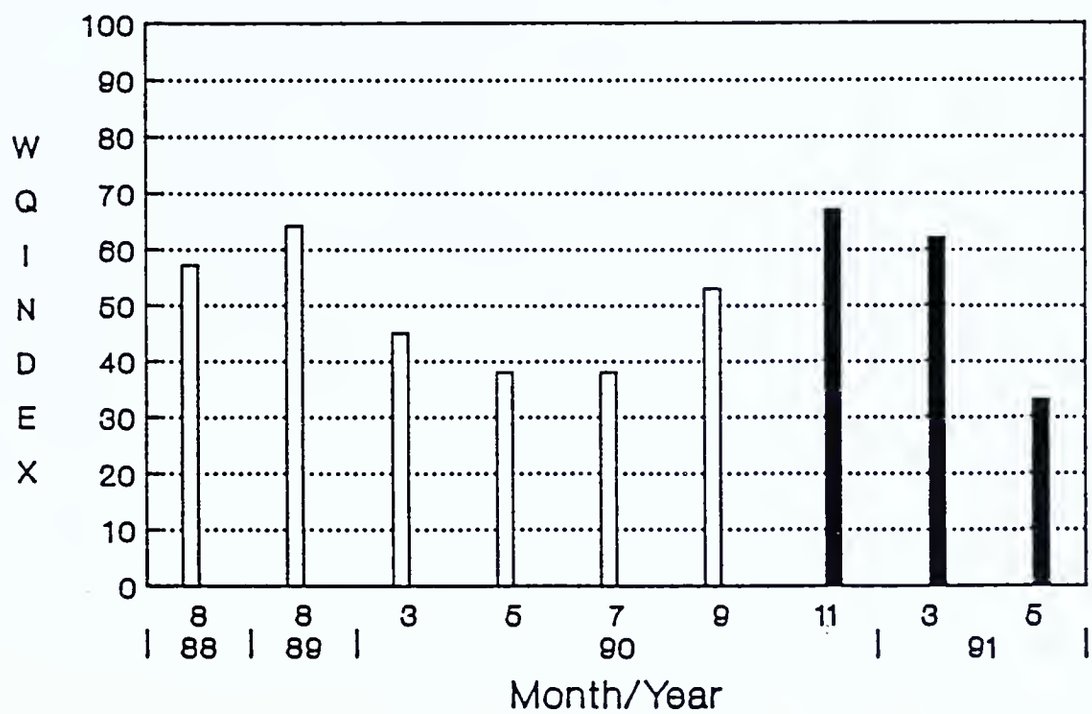


TABLE 11.--Water-quality summary Tioga River Lindley, N.Y.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	11/14/90	666 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TAl	11/14/90	524 ug/l	500 ug/l	Pa. chronic fish criteria
TFe	03/19/91	601 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TAL	03/19/91	599 ug/l	500 ug/l	Pa. chronic fish criteria

Date	WQ Index	Parameters exceeding 90th percentile
11/14/90	66	TMn, DMn
03/19/91	51	TNH_3, TMn, DMn
05/22/91	34	TSO_4, TMn, DMn, ALK

Water-Quality Index

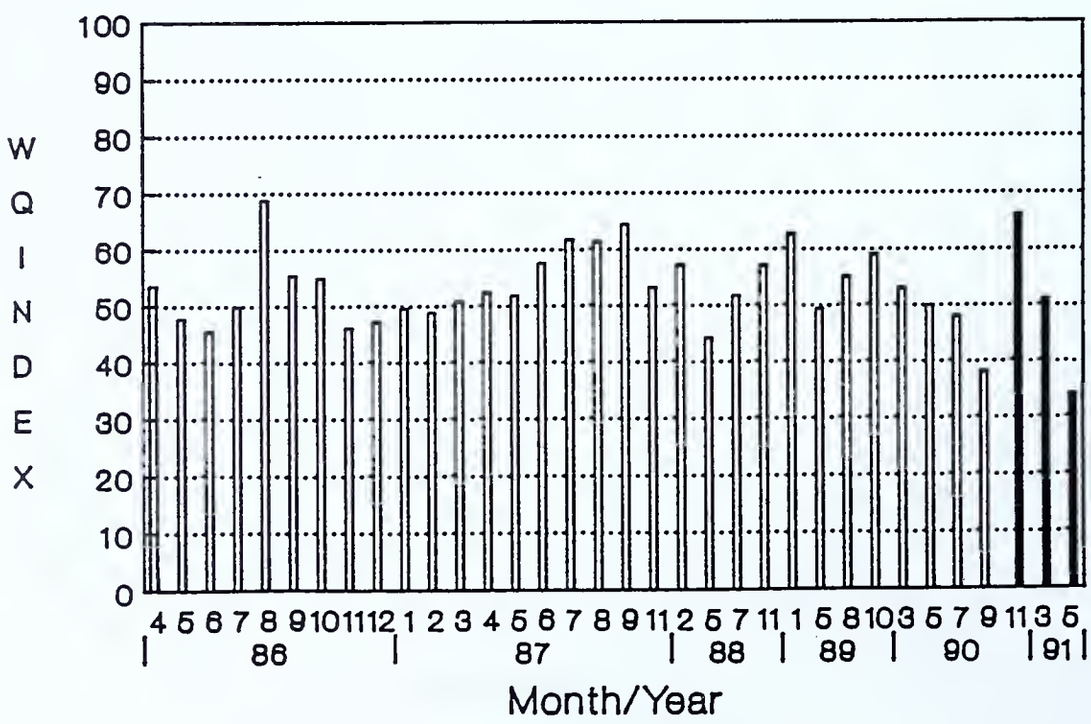


TABLE 12.--Water-quality summary Chemung River at Chemung, N.Y.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	11/14/90	347 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TFe	03/19/91	310 ug/l	300 ug/l	N.Y. health (water source) and aquatic

Date	WQ Index	Parameters exceeding 90th percentile
11/14/90	59	DFe
03/19/91	58	DNO_3, TNO_3, TCl
05/22/91	66	TS, DS, TNO_2, DNO_2, DP, DPO_4, TMg, TCl, TSO_4

Water-Quality Index

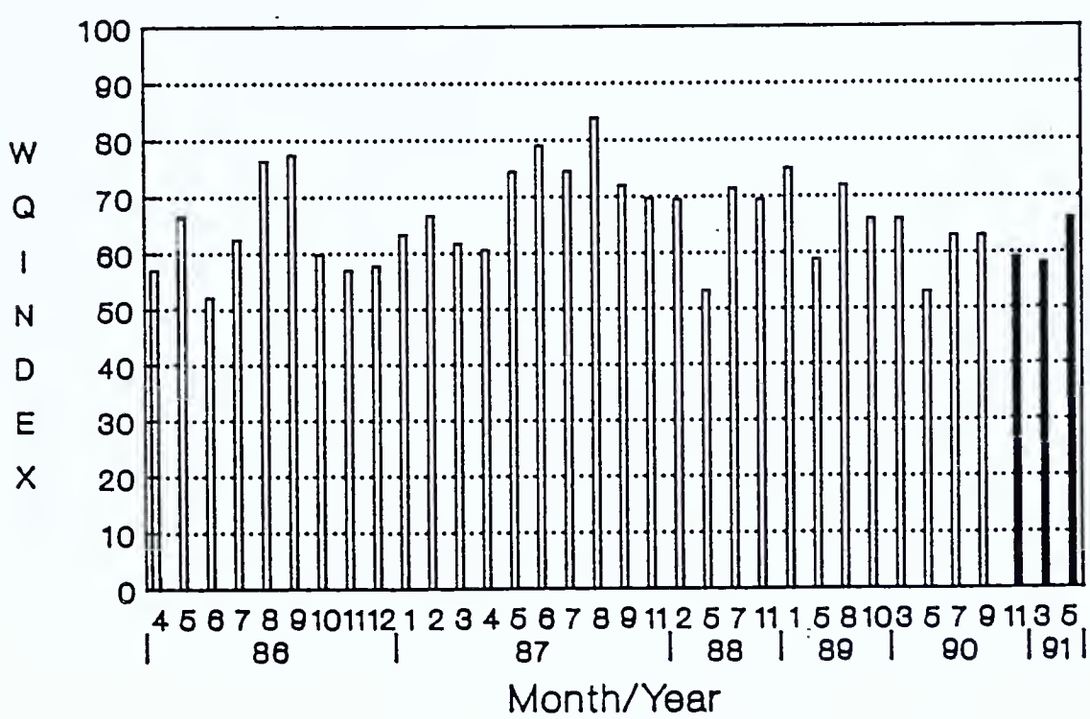


TABLE 13.--Water-quality summary Susquehanna River at Sayre, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	11/13/90	1,470 ug/l	300 ug/l	N.Y. health (water source) and aquatic
TAl	11/13/90	1,010 ug/l	500 ug/l	Pa. chronic fish criteria
TFe	05/21/91	405 ug/l	300 ug/l	N.Y. health (water source) and aquatic

Date	WQ Index	Parameters exceeding 90th percentile
11/13/90	57	BOD, TKN, TP, TOC, TAl, TURB
03/18/91	51	DNO_3, TNO_3
05/21/91	41	

Water-Quality Index

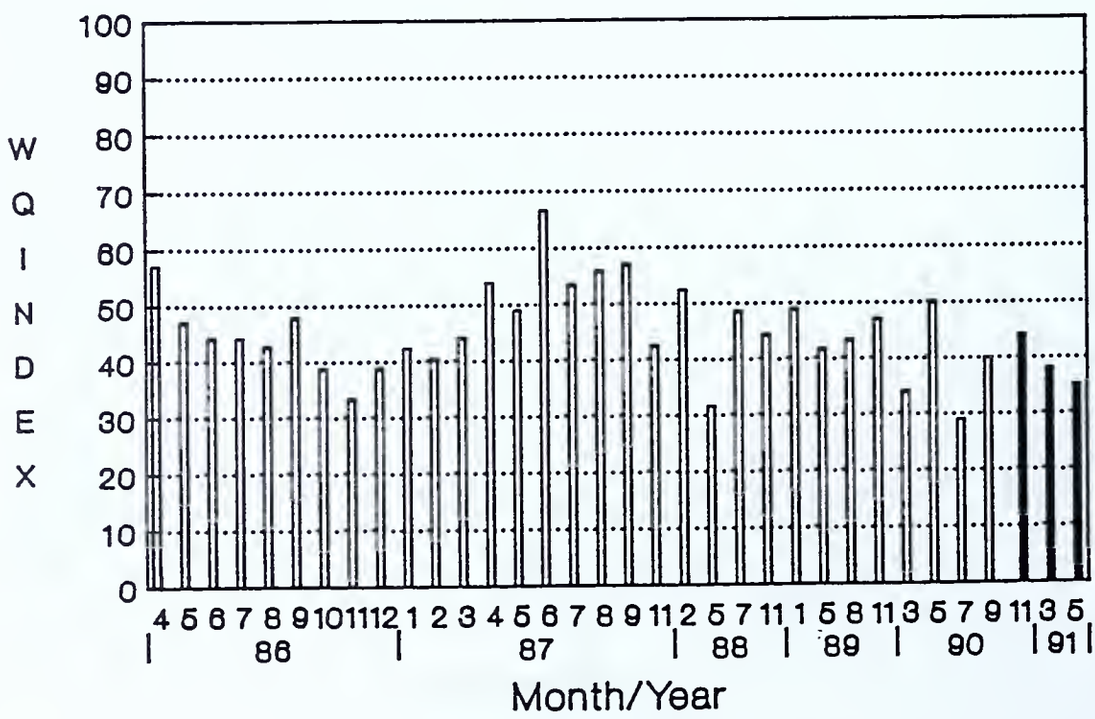


TABLE 14.--Water-quality summary Susquehanna River at Marietta, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters exceeding 90th percentile
10/11/90	35	TSO_4
12/18/90	40	DMn
04/16/91	38	ALK
06/20/91	55	TS, DS, TMg, TSO_4, TMn, DAl

Water-Quality Index

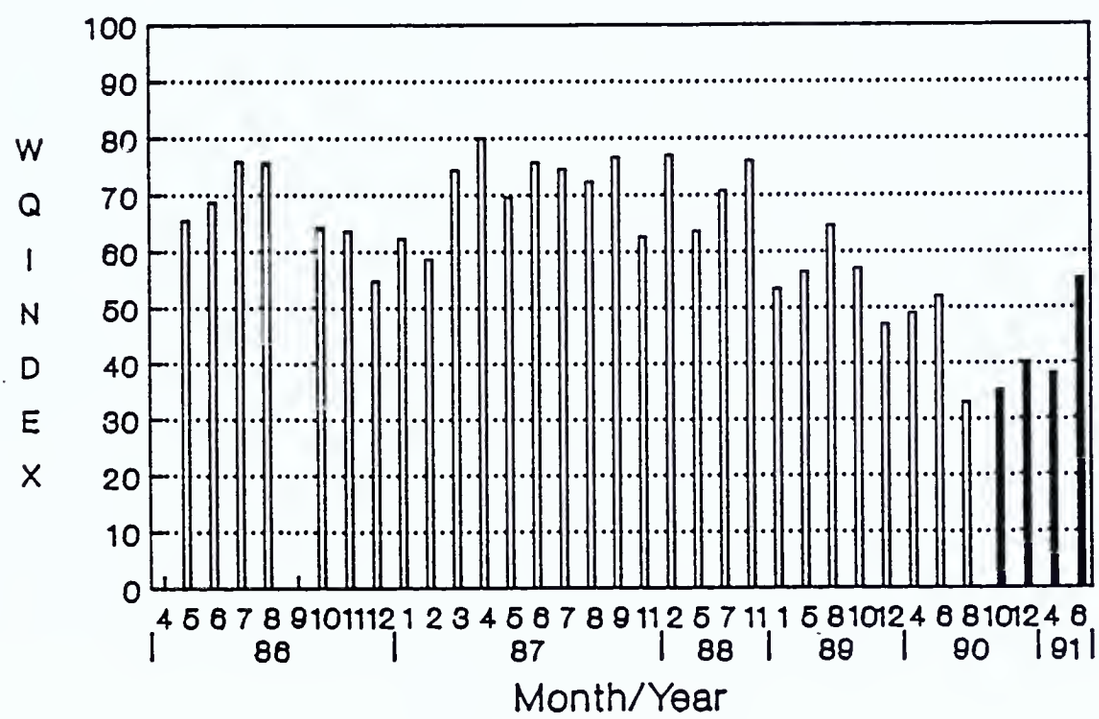


TABLE 15.--Water-quality summary Scott Creek at Delta, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	10/10/90	4,500 ug/l	1,500 ug/l	Pa. chronic fish criteria
DFe	10/10/90	2,650 ug/l	1,500 ug/l	Pa. chronic fish criteria
DFe	10/10/90	2,650 ug/l	300 ug/l	Pa. chronic human health
DO	10/10/90	3.5 mg/l	5.0 mg/l	Md./Pa.
DFe	12/19/90	398 ug/l	300 ug/l	Pa. chronic human health

Date	WQ Index	Parameters exceeding 90th percentile
10/10/90	83	BOD, TS, TNH_3, DNH_3, TNO_2, DNO_2, DKN, TKN, TP, DP, TOC, TMg, TFe, DFe, TMn, DMn, TPO_4, TURB
12/19/90	75	DS, TNH_3, DNH_3, TMg, TCl, DFe, TMn, DMn
04/17/91	61	TP, DP, DPO_4, TPO_4
06/19/91	73	TNH_3, DNH_3, TNO_2, DNO_2, DKN, TKN, DPO_4, ALK

Water-Quality Index

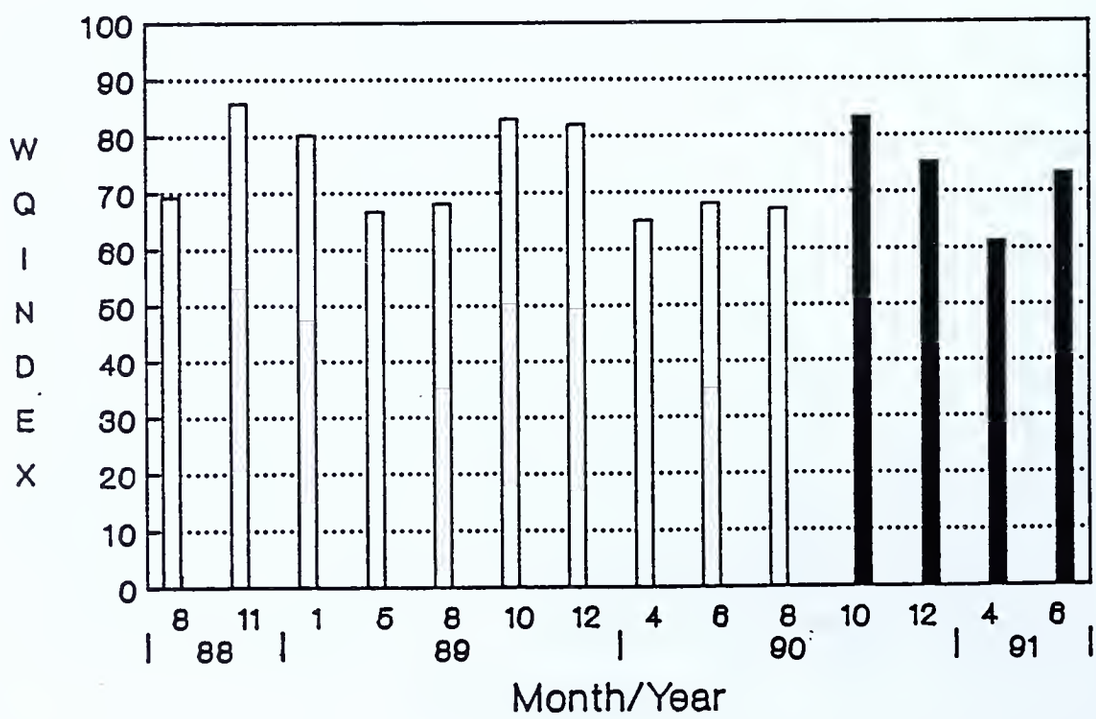


TABLE 16.--Water-quality summary Conowingo Creek at Pleasant Grove, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TFe	12/19/90	1,900 ug/l	1,500 ug/l	Pa. chronic fish criteria
TAl	12/19/90	1,680 ug/l	500 ug/l	Pa. chronic fish criteria
TAl	06/19/91	517 ug/l	500 ug/l	Pa. chronic fish criteria

Date	WQ Index	Parameters exceeding 90th percentile
10/10/90	44	DNO_3, TNO_3
12/19/90	81	BOD, DNO_3, TNO_3, DKN, TKN, TP, DP, DPO_4, TOC, TFe, DFe, TAl, TPO_4, TURB
04/17/91	53	DNO_3, TNO_3
06/19/91	70	TAl

Water-Quality Index

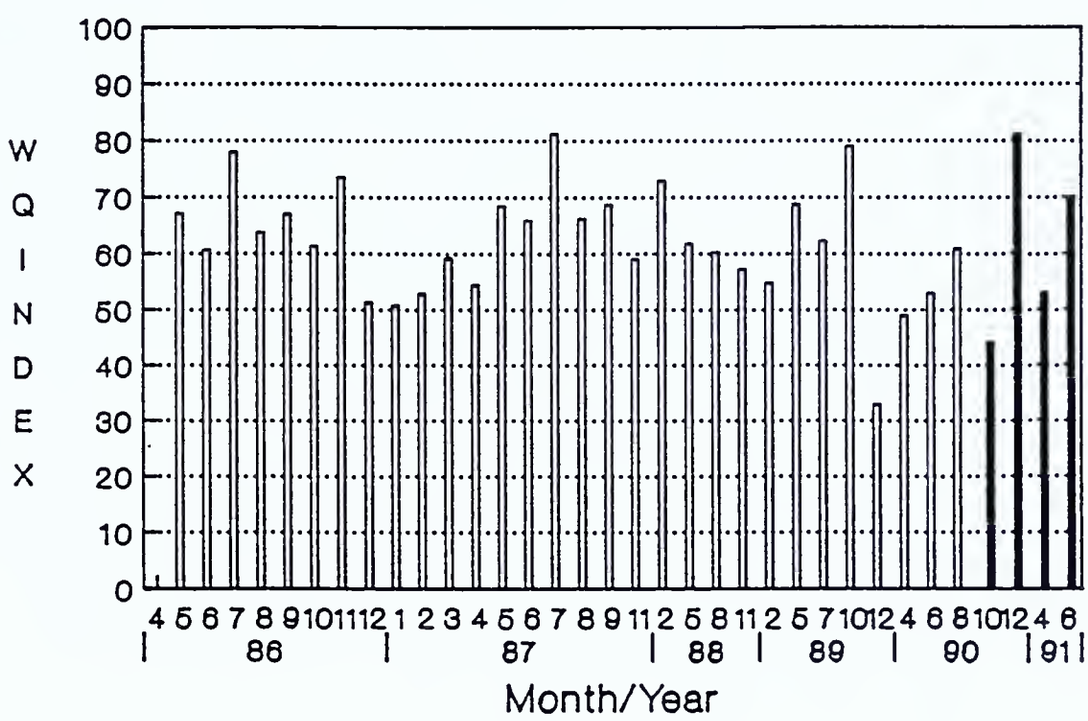


TABLE 17.--Water-quality summary Octoraro Creek at Rising Sun, Md.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters exceeding 90th percentile
10/10/90	38	
12/18/90	54	
04/15/91	48	
06/18/91	64	TOC, DA1

Water-Quality Index

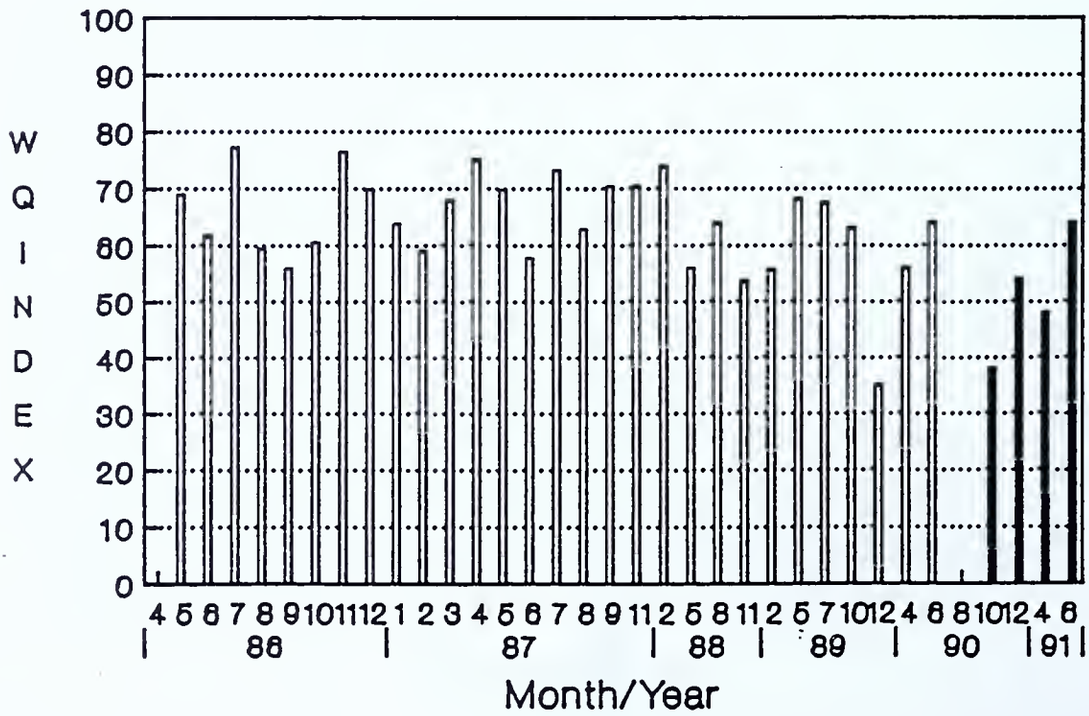


TABLE 18.--Water-quality summary Ebaughs Creek at Stewartstown, Pa.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
TAl	06/18/91	760 ug/l	500 ug/l	Pa. chronic fish criteria

Date	WQ Index	Parameters exceeding 90th percentile
10/09/90	27	
12/17/90	31	DO
04/15/91	34	TCl
06/18/91	49	TFe, TAl
07/30/90	28	

Water-Quality Index

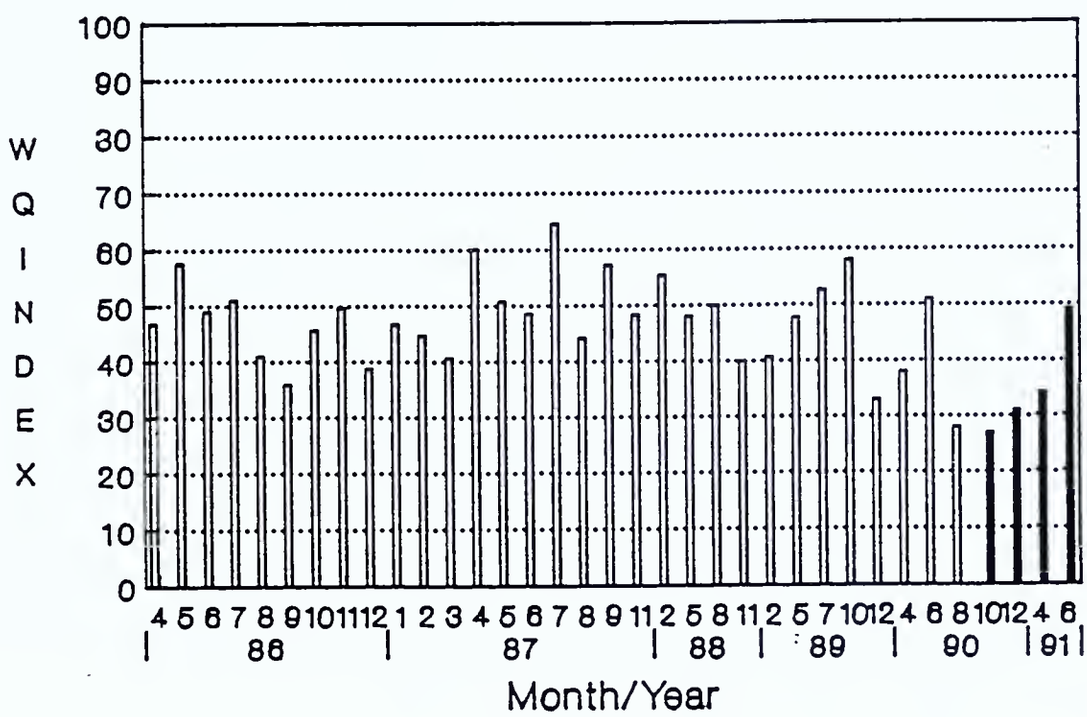


TABLE 19.--Water-quality summary Deer Creek at Gorsuch Mills, Md.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters exceeding 90th percentile
10/09/90	37	TURB
12/17/90	17	DO
04/15/91	18	
06/18/91	47	

Water-Quality Index

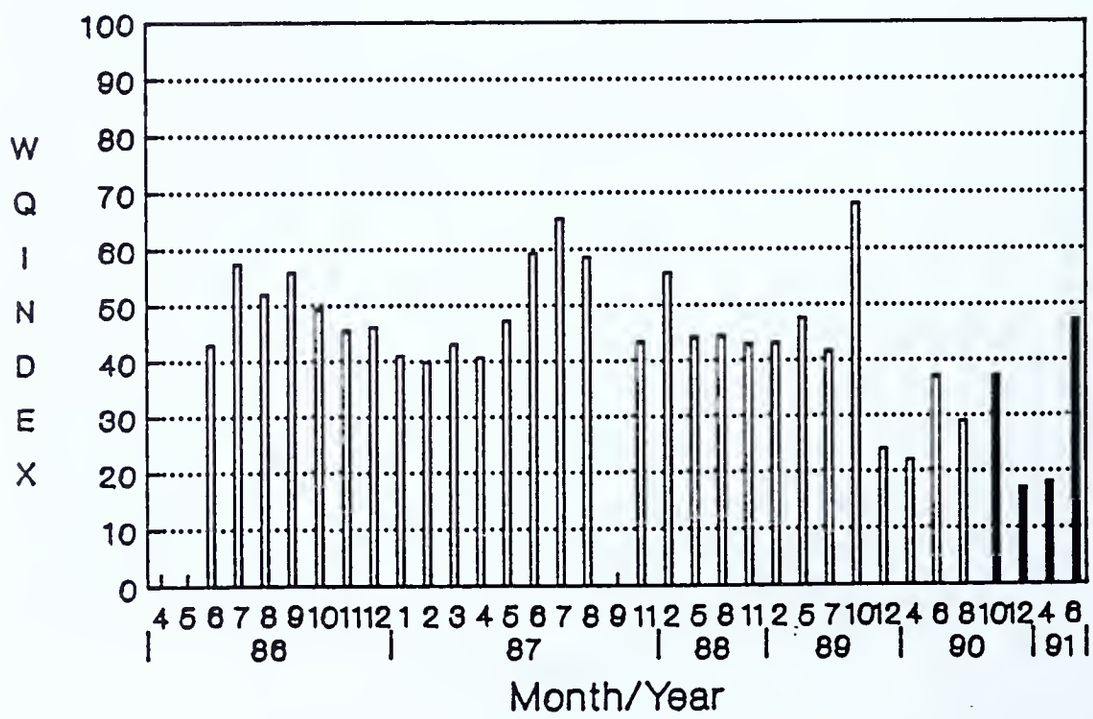
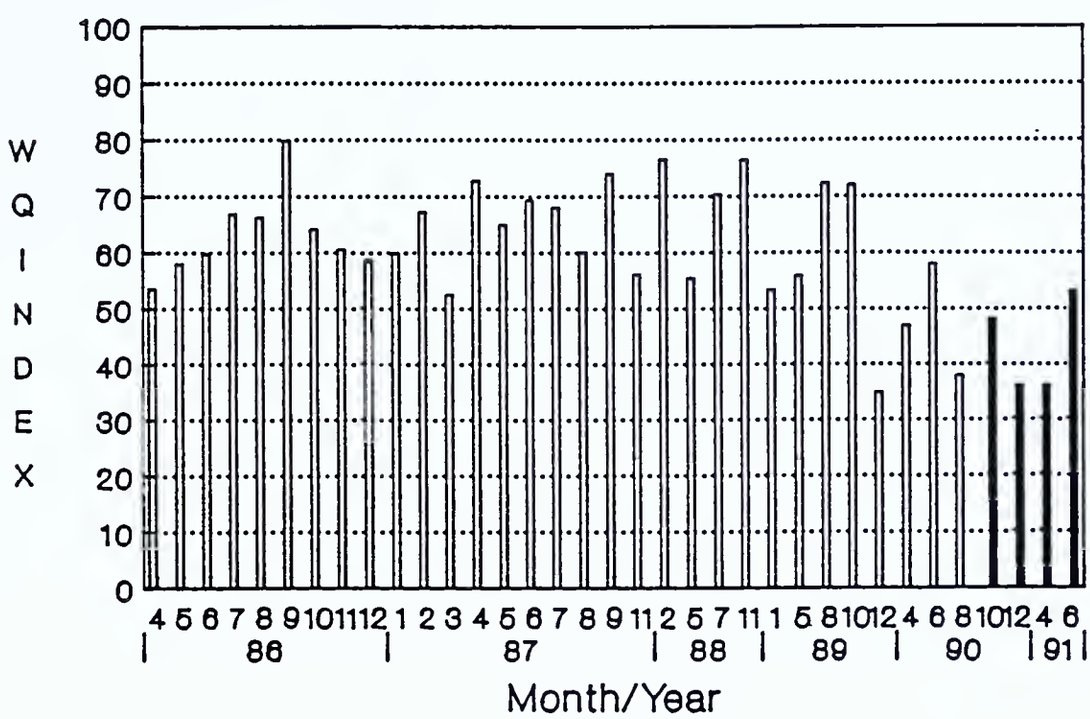


TABLE 20.--Water-quality summary Susquehanna River at Conowingo, Md.

Parameters exceeding standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters exceeding 90th percentile
10/10/90	48	TSO_4
12/17/90	36	
04/15/91	36	
06/18/91	53	TS, TNO_2, DNO_2, ALK

Water-Quality Index



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APPENDIX A.--Data for Group 1 stations

TABLE A1.--Water-quality data for Susquehanna River at Windsor, N.Y.

Parameter	Unit	11/13/90 13:15	03/18/91 11:00	05/21/91 12:00
Discharge	cfs	---	559	2,075
Temperature	°Celsius	5	4	17.3
Conductivity	umhos/cm	125	180	170
Dissolved Oxygen	mg/l	---	12.4	8.4
Biochemical Oxygen Demand	mg/l	1.6	1.6	0.8
pH	mg/l	7	7.4	7.4
Alkalinity	mg/l	35	78	79
Acidity	mg/l	4	2	6
Solids - Dissolved	mg/l	120	136	116
Total	mg/l	154	146	130
Ammonia as N - Dissolved	mg/l	0.02	0.05	0.02
Total	mg/l	0.02	0.05	0.05
Nitrite as N - Dissolved	mg/l	0.004	0.008	0.008
Total	mg/l	0.004	0.008	0.008
Nitrate as N - Dissolved	mg/l	0.64	0.92	0.57
Total	mg/l	0.64	0.92	0.57
Kjeldahl as N - Dissolved	mg/l	0.9	0.26	0.33
Total	mg/l	0.9	0.28	0.31
Phosphorus - Dissolved	mg/l	0.04	0.02	0.02
Total	mg/l	0.07	0.03	0.05
Orthophosphate as P - Dissolved	mg/l	0.002	0.02	0.002
Total	mg/l	0.01	0.02	0.008
Total Organic Carbon	mg/l	4.5	2	2.5
Magnesium - Total	mg/l	1.93	2.49	2.64
Chloride - Total	mg/l	5	10	8
Sulfate - Total	mg/l	16	22	32
Turbidity	NTU	27	4.4	2
Iron - Dissolved	ug/l	61	46	53
Total	ug/l	1,470*	241	387*
Manganese - Dissolved	ug/l	10	20	14
Total	ug/l	16	29	42
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	913*	201	230
WATER-QUALITY INDEX		44	45	34

* Values exceed water-quality standards.

TABLE A2.--Water-quality data for Susquehanna River at Kirkwood, N.Y.

Parameter	Unit	11/13/90 12:00	03/18/91 10:15	05/21/91 11:00
Discharge	cfs	14,200	4,000	2,280
Temperature	°Celsius	4	3.9	17.4
Conductivity	umhos/cm	125	165	166
Dissolved Oxygen	mg/l	---	14.6	8.5
Biochemical Oxygen Demand	mg/l	1.6	0.8	0.8
pH	mg/l	7.2	7.7	7.6
Alkalinity	mg/l	30	52	66
Acidity	mg/l	4	4	3
Solids - Dissolved	mg/l	118	112	88
Total	mg/l	134	126	98
Ammonia as N - Dissolved	mg/l	0.02	0.02	0.02
Total	mg/l	0.02	0.02	0.04
Nitrite as N - Dissolved	mg/l	0.004	0.008	0.008
Total	mg/l	0.004	0.008	0.008
Nitrate as N - Dissolved	mg/l	0.59	0.89	0.59
Total	mg/l	0.59	0.89	0.51
Kjeldahl as N - Dissolved	mg/l	0.6	0.3	0.42
Total	mg/l	0.98	0.32	0.44
Phosphorus - Dissolved	mg/l	0.04	0.02	0.03
Total	mg/l	0.08	0.03	0.05
Orthophosphate as P - Dissolved	mg/l	0.008	0.02	0.002
Total	mg/l	0.014	0.02	---
Total Organic Carbon	mg/l	4.8	1.8	2.7
Magnesium - Total	mg/l	1.82	2.36	2.57
Chloride - Total	mg/l	4	9	8
Sulfate - Total	mg/l	18	30	49
Turbidity	NTU	26	3.7	1
Iron - Dissolved	ug/l	95	66	30
Total	ug/l	586*	307*	375*
Manganese - Dissolved	ug/l	10	19	12
Total	ug/l	20	26	47
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	314	269	213
WATER-QUALITY INDEX		44	38	35

* Values exceed water-quality standards.

TABLE A3.--Water-quality data for Cayuta Creek at Waverly, N.Y.

Parameter	Unit	11/14/90 10:30	03/18/91 14:30	05/21/91 14:30
Discharge	cfs	---	---	52.84
Temperature	°Celsius	5	4.6	19.5
Conductivity	umhos/cm	175	198	358
Dissolved Oxygen	mg/l	---	13.1	11.2
Biochemical Oxygen Demand	mg/l	1.2	0.8	1.2
pH	mg/l	7.2	7.2	8.3
Alkalinity	mg/l	41	48	91
Acidity	mg/l	2	2	0
Solids - Dissolved	mg/l	170	210	224
Total	mg/l	178	216	232
Ammonia as N - Dissolved	mg/l	0.02	0.02	0.17
Total	mg/l	0.02	0.02	0.2
Nitrite as N - Dissolved	mg/l	0.004	0.006	0.018
Total	mg/l	0.004	0.006	0.024
Nitrate as N - Dissolved	mg/l	0.55	0.7	0.44
Total	mg/l	0.55	0.7	0.44
Kjeldahl as N - Dissolved	mg/l	0.2	0.37	0.44
Total	mg/l	0.23	0.37	0.52
Phosphorus - Dissolved	mg/l	0.04	0.04	0.06
Total	mg/l	0.05	0.04	0.08
Orthophosphate as P - Dissolved	mg/l	0.007	0.02	0.033
Total	mg/l	0.02	0.02	0.04
Total Organic Carbon	mg/l	2.9	2.1	2.5
Magnesium - Total	mg/l	3.83	3.71	6.91
Chloride - Total	mg/l	11	15	33
Sulfate - Total	mg/l	24	26	35
Turbidity	NTU	4.2	5	1.1
Iron - Dissolved	ug/l	57	33	10
Total	ug/l	241	202	106
Manganese - Dissolved	ug/l	10	10	10
Total	ug/l	10	11	14
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	135	140	135
WATER-QUALITY INDEX		36	42	60

TABLE A4.--Water-quality data for Troups Creek at Austinburg, Pa.

Parameter	Unit	11/15/90 9:30	03/20/91 9:00	05/22/91 15:00
Discharge	cfs	71.77	40.59	9.45
Temperature	°Celsius	4	4.2	23.4
Conductivity	umhos/cm	222	162	244
Dissolved Oxygen	mg/l	---	13.6	9.8
Biochemical Oxygen Demand	mg/l	1.2	0.8	2.4
pH	mg/l	7.2	7.5	8.4
Alkalinity	mg/l	49	46	116
Acidity	mg/l	4	2	0
Solids - Dissolved	mg/l	136	100	168
Total	mg/l	160	136	180
Ammonia as N - Dissolved	mg/l	0.02	0.04	0.07
Total	mg/l	0.02	0.05	0.13
Nitrite as N - Dissolved	mg/l	0.004	0.008	0.008
Total	mg/l	0.004	0.012	0.008
Nitrate as N - Dissolved	mg/l	0.68	0.69	0.18
Total	mg/l	0.68	0.69	0.18
Kjeldahl as N - Dissolved	mg/l	0.21	0.2	0.78
Total	mg/l	0.32	0.2	0.78
Phosphorus - Dissolved	mg/l	0.02	0.03	0.02
Total	mg/l	0.03	0.04	0.02
Orthophosphate as P - Dissolved	mg/l	0.002	0.02	0.002
Total	mg/l	0.002	0.04	0.002
Total Organic Carbon	mg/l	3.1	2.8	3.5
Magnesium - Total	mg/l	4.32	4.23	6.37
Chloride - Total	mg/l	7	10	12
Sulfate - Total	mg/l	21	23	24
Turbidity	NTU	21	40	1
Iron - Dissolved	ug/l	22	45	14
Total	ug/l	198	2,200*	109
Manganese - Dissolved	ug/l	38	10	18
Total	ug/l	42	27	17
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	236	2,530*	145
WATER-QUALITY INDEX		35	46	45

* Values exceed water-quality standards.

TABLE A5.--Water-quality data for Cowanesque River at Lawrenceville, Pa.

Parameter	Unit	11/14/90 15:00	03/19/91 13:30	05/22/91 12:00
Discharge	cfs	420	290	52
Temperature	°Celsius	8.5	4	14.6
Conductivity	umhos/cm	280	138	173
Dissolved Oxygen	mg/l	---	13.1	11.9
Biochemical Oxygen Demand	mg/l	1.6	0.8	0.8
pH	mg/l	7.1	6.9	8.2
Alkalinity	mg/l	44	32	60
Acidity	mg/l	4	4	2
Solids - Dissolved	mg/l	136	112	118
Total	mg/l	144	140	126
Ammonia as N - Dissolved	mg/l	0.07	0.06	0.04
Total	mg/l	0.07	0.09	0.04
Nitrite as N - Dissolved	mg/l	0.018	0.01	0.01
Total	mg/l	0.02	0.016	0.01
Nitrate as N - Dissolved	mg/l	0.71	0.84	0.57
Total	mg/l	0.71	0.84	0.57
Kjeldahl as N - Dissolved	mg/l	0.44	0.24	0.25
Total	mg/l	0.68	0.33	0.25
Phosphorus - Dissolved	mg/l	0.04	0.03	0.02
Total	mg/l	0.06	0.07	0.02
Orthophosphate as P - Dissolved	mg/l	0.004	0.02	0.002
Total	mg/l	0.021	0.05	0.002
Total Organic Carbon	mg/l	5.2	3.8	2.8
Magnesium - Total	mg/l	3.87	3.19	4.16
Chloride - Total	mg/l	7	8	9
Sulfate - Total	mg/l	23	23	24
Turbidity	NTU	21	40	1
Iron - Dissolved	ug/l	119	92	10
Total	ug/l	808*	2,020*	85
Manganese - Dissolved	ug/l	17	19	40
Total	ug/l	30	49	76
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	607*	2,490*	270
WATER-QUALITY INDEX		67	62	33

* Values exceed water-quality standards.

TABLE A6.--Water-quality data for Tioga River at Lindley, N.Y.

Parameter	Unit	11/14/90 13:00	03/19/91 12:00	05/22/91 10:30
Discharge	cfs	1,292	938	219
Temperature	°Celsius	5	3.9	16.3
Conductivity	umhos/cm	235	160	180
Dissolved Oxygen	mg/l	---	13.2	8.7
Biochemical Oxygen Demand	mg/l	1.6	0.4	0.8
pH	mg/l	6.9	7.3	6.9
Alkalinity	mg/l	27	20	92
Acidity	mg/l	2	4	8
Solids - Dissolved	mg/l	144	114	128
Total	mg/l	168	114	138
Ammonia as N - Dissolved	mg/l	0.05	0.09	0.02
Total	mg/l	0.05	0.09	0.03
Nitrite as N - Dissolved	mg/l	0.012	0.008	0.01
Total	mg/l	0.014	0.012	0.01
Nitrate as N - Dissolved	mg/l	0.69	0.85	0.55
Total	mg/l	0.69	0.85	0.55
Kjeldahl as N - Dissolved	mg/l	0.77	0.2	0.23
Total	mg/l	0.77	0.2	0.29
Phosphorus - Dissolved	mg/l	0.03	0.02	0.02
Total	mg/l	0.06	0.04	0.03
Orthophosphate as P - Dissolved	mg/l	0.002	0.02	0.002
Total	mg/l	0.008	0.02	---
Total Organic Carbon	mg/l	4.2	2.6	2.3
Magnesium - Total	mg/l	4.43	3.73	4.82
Chloride - Total	mg/l	7	6	8
Sulfate - Total	mg/l	32	34	36
Turbidity	NTU	29	22	1.5
Iron - Dissolved	ug/l	61	55	10
Total	ug/l	666*	601*	113
Manganese - Dissolved	ug/l	395	393	137
Total	ug/l	476	446	177
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	524*	599*	135
WATER-QUALITY INDEX		66	51	34

* Values exceed water-quality standards.

TABLE A7.--Water-quality data for Chemung River at Chemung, N.Y.

Parameter	Unit	11/14/90 8:00	03/19/91 9:00	05/22/91 8:30
Discharge	cfs	4,308	3,375	1,125
Temperature	°Celsius	4	5.3	21.1
Conductivity	umhos/cm	270	250	500
Dissolved Oxygen	mg/l	---	12.8	10.2
Biochemical Oxygen Demand	mg/l	1.2	0.8	0.8
pH	mg/l	7.3	7.5	8.6
Alkalinity	mg/l	52	60	71
Acidity	mg/l	6	2	0
Solids - Dissolved	mg/l	128	184	246
Total	mg/l	150	194	260
Ammonia as N - Dissolved	mg/l	0.02	0.04	0.02
Total	mg/l	0.02	0.05	0.08
Nitrite as N - Dissolved	mg/l	0.008	0.012	0.024
Total	mg/l	0.016	0.012	0.024
Nitrate as N - Dissolved	mg/l	0.78	1.04	0.79
Total	mg/l	0.78	1.04	0.81
Kjeldahl as N - Dissolved	mg/l	0.63	0.2	0.39
Total	mg/l	0.71	0.22	0.56
Phosphorus - Dissolved	mg/l	0.04	0.03	0.05
Total	mg/l	0.05	0.04	0.07
Orthophosphate as P - Dissolved	mg/l	0.012	0.02	0.022
Total	mg/l	0.012	0.02	0.042
Total Organic Carbon	mg/l	3.8	2.4	2.8
Magnesium - Total	mg/l	4.94	5.45	8.86
Chloride - Total	mg/l	13	18	78
Sulfate - Total	mg/l	25	31	37
Turbidity	NTU	14	6.2	1
Iron - Dissolved	ug/l	274	18	10
Total	ug/l	347*	310*	225
Manganese - Dissolved	ug/l	28	86	25
Total	ug/l	43	97	88
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	229	233	135
WATER-QUALITY INDEX		59	58	66

* Values exceed water-quality standards.

TABLE A8.--Water-quality data for Susquehanna River at Sayre, Pa.

Parameter	Unit	11/13/90 14:30	03/18/91 13:30	05/21/91 13:45
Discharge	cfs	34,350	8,717	4,957
Temperature	°Celsius	5	4.7	19.7
Conductivity	umhos/cm	130	220	200
Dissolved Oxygen	mg/l	---	12.8	11.3
Biochemical Oxygen Demand	mg/l	2	0.8	1.2
pH	mg/l	6.9	7.5	8.6
Alkalinity	mg/l	31	58	88
Acidity	mg/l	4	4	0
Solids - Dissolved	mg/l	146	132	124
Total	mg/l	186	150	138
Ammonia as N - Dissolved	mg/l	0.04	0.06	0.02
Total	mg/l	0.04	0.06	0.08
Nitrite as N - Dissolved	mg/l	0.006	0.012	0.012
Total	mg/l	0.006	0.012	0.012
Nitrate as N - Dissolved	mg/l	0.64	1.11	0.57
Total	mg/l	0.64	1.11	0.57
Kjeldahl as N - Dissolved	mg/l	0.77	0.3	0.29
Total	mg/l	0.92	0.3	0.29
Phosphorus - Dissolved	mg/l	0.04	0.03	0.02
Total	mg/l	0.1	0.04	0.06
Orthophosphate as P - Dissolved	mg/l	0.003	0.02	0.002
Total	mg/l	0.016	0.02	0.017
Total Organic Carbon	mg/l	4.7	2	2.7
Magnesium - Total	mg/l	2.43	3.56	3.7
Chloride - Total	mg/l	6	17	12
Sulfate - Total	mg/l	13	23	24
Turbidity	NTU	36	3.7	2.1
Iron - Dissolved	ug/l	90	49	10
Total	ug/l	1,470*	233	405*
Manganese - Dissolved	ug/l	10	22	10
Total	ug/l	40	28	47
Aluminum - Dissolved	ug/l	135	135	135
Total	ug/l	1,010*	213	246
WATER-QUALITY INDEX		57	51	41

* Values exceed water-quality standards.

TABLE A9.--Water-quality data for Susquehanna River at Marietta, Pa.

Parameter	Unit	10/11/90 10:30	12/18/90 9:30	04/16/91 10:00	06/20/91 12:00
Discharge	cfs	12,600	36,280	35,840	6,427
Temperature	°Celsius	20	4	10.3	25.3
Conductivity	umhos/cm	345	372	215	375
Dissolved Oxygen	mg/l	8.5	9.7	10.4	7.9
Biochemical Oxygen Demand	mg/l	0.4	0.8	1.2	1.2
pH	mg/l	7.3	7.5	8	7.4
Alkalinity	mg/l	46	38	137	125
Acidity	mg/l	6	2	4	4
Solids - Dissolved	mg/l	189	134	132	242
Total	mg/l	206	154	142	242
Ammonia as N - Dissolved	mg/l	0.02	0.05	0.05	0.04
Total	mg/l	0.02	0.05	0.06	0.04
Nitrite as N - Dissolved	mg/l	0.012	0.012	0.014	0.012
Total	mg/l	0.012	0.012	0.014	0.012
Nitrate as N - Dissolved	mg/l	0.9	0.98	0.87	0.91
Total	mg/l	0.9	0.98	0.87	0.91
Kjeldahl as N - Dissolved	mg/l	0.2	0.2	0.2	0.22
Total	mg/l	0.21	0.2	0.27	0.43
Phosphorus - Dissolved	mg/l	0.02	0.02	0.02	0.02
Total	mg/l	0.05	0.02	0.05	0.04
Orthophosphate as P - Dissolved	mg/l	0.003	0.006	0.002	0.004
Total	mg/l	0.007	0.013	0.01	0.012
Total Organic Carbon	mg/l	2.2	2.4	3.1	2.8
Magnesium - Total	mg/l	9.22	5.83	5.14	12.2
Chloride - Total	mg/l	15	10	13	21
Sulfate - Total	mg/l	63	36	52	75
Turbidity	NTU	5.3	3.9	1	2.8
Iron - Dissolved	ug/l	100	144	131	185
Total	ug/l	170	578	516	1080
Manganese - Dissolved	ug/l	50	140	50	109
Total	ug/l	60	198	71	363
Aluminum - Dissolved	ug/l	150	150	150	159
Total	ug/l	150	209	215	160
WATER-QUALITY INDEX		35	40	38	55

TABLE A10.--Water-quality data for Scott Creek at Delta, Pa.

Parameter	Unit	10/10/90 10:15	12/19/90 9:30	04/17/91 12:30	06/19/91 11:00
Discharge	cfs	<0.1	0.753	1.169	0.322
Temperature	°Celsius	18	7	12.2	16.9
Conductivity	umhos/cm	370	470	255	220
Dissolved Oxygen	mg/l	3.5	9.6	10.2	7.7
Biochemical Oxygen Demand	mg/l	16	0.8	1.5	1.6
pH	mg/l	6.9	7.2	7.4	7.05
Alkalinity	mg/l	92	56	94	153
Acidity	mg/l	24	6	4	12
Solids - Dissolved	mg/l	200	210	182	190
Total	mg/l	218	214	186	214
Ammonia as N - Dissolved	mg/l	4.08	0.53	0.22	1.04
Total	mg/l	4.08	0.53	0.24	1.38
Nitrite as N - Dissolved	mg/l	0.23	0.046	0.046	0.2
Total	mg/l	2.15	0.046	0.05	0.2
Nitrate as N - Dissolved	mg/l	3.6	2.46	2.85	2.31
Total	mg/l	1.68	2.46	2.85	2.31
Kjeldahl as N - Dissolved	mg/l	9	0.99	0.45	1.92
Total	mg/l	9	1.01	0.49	1.92
Phosphorus - Dissolved	mg/l	0.16	0.04	0.82	0.1
Total	mg/l	0.66	0.09	0.99	0.2
Orthophosphate as P - Dissolved	mg/l	0.07	0.034	0.758	0.085
Total	mg/l	0.29	0.085	0.84	0.104
Total Organic Carbon	mg/l	12.7	3.3	2.2	3.1
Magnesium - Total	mg/l	11.4	13.7	8.67	8.84
Chloride - Total	mg/l	32	41	32	32
Sulfate - Total	mg/l	23	35	31	20
Turbidity	NTU	18.1	6.2	1	3.4
Iron - Dissolved	ug/l	2,650*	398**	21	146
Total	ug/l	4,500*	1,190	456	757
Manganese - Dissolved	ug/l	841	329	15	97
Total	ug/l	841	329	177	126
Aluminum - Dissolved	ug/l	135	135	135	135
Total	ug/l	135	152	135	135
WATER-QUALITY INDEX		83	75	61	73

* Values exceed water-quality standards.

**The dissolved iron value of 398 ug/l exceeds the Pennsylvania standard for chronic human health.

TABLE A11.--Water-quality data for Conowingo Creek at Pleasant Grove, Pa.

Parameter	Unit	10/10/90 12:00	12/19/90 11:45	04/17/91 10:00	06/19/91 12:30
Discharge	cfs	21.3	48.56	38.99	20.9
Temperature	°Celsius	19	7	12.3	19.1
Conductivity	umhos/cm	220	345	210	215
Dissolved Oxygen	mg/l	8.1	9.8	10	9
Biochemical Oxygen Demand	mg/l	0.8	2	0.5	1.2
pH	mg/l	6.9	7	7.7	7.25
Alkalinity	mg/l	34	65	79	88
Acidity	mg/l	8	4	2	5
Solids - Dissolved	mg/l	120	144	186	152
Total	mg/l	134	156	198	180
Ammonia as N - Dissolved	mg/l	0.04	0.25	0.05	0.08
Total	mg/l	0.04	0.25	0.05	0.08
Nitrite as N - Dissolved	mg/l	0.03	0.034	0.04	0.076
Total	mg/l	0.03	0.038	0.042	0.076
Nitrate as N - Dissolved	mg/l	7.23	11.1	8.19	6.21
Total	mg/l	7.23	11.1	8.19	6.21
Kjeldahl as N - Dissolved	mg/l	0.38	1.26	0.42	0.62
Total	mg/l	0.44	1.55	0.49	0.74
Phosphorus - Dissolved	mg/l	0.05	0.26	0.04	0.07
Total	mg/l	0.07	0.36	0.07	0.13
Orthophosphate as P - Dissolved	mg/l	0.022	0.22	0.021	0.049
Total	mg/l	0.039	0.25	0.031	0.063
Total Organic Carbon	mg/l	2.7	8	2.3	3.6
Magnesium - Total	mg/l	7.65	9.74	8.23	8.45
Chloride - Total	mg/l	15	17	16	16
Sulfate - Total	mg/l	14	23	23	11
Turbidity	NTU	8.2	25	1	5.3
Iron - Dissolved	ug/l	15	219	54	84
Total	ug/l	252	1,900*	468	891
Manganese - Dissolved	ug/l	27	58	33	59
Total	ug/l	35	68	56	89
Aluminum - Dissolved	ug/l	135	135	135	135
Total	ug/l	135	1,680*	243	517*
WATER-QUALITY INDEX		44	81	53	70

* Values exceed water-quality standards.

TABLE A12.--Water-quality data for Octoraro Creek at Rising Sun, Md.

Parameter	Unit	10/10/90 11:45	12/18/90 13:15	04/15/91 13:00	06/18/91 14:30
Discharge	cfs	55.2	138.8	215.2	113.5
Temperature	°Celsius	19	6	10.5	21.9
Conductivity	umhos/cm	220	390	210	195
Dissolved Oxygen	mg/l	10.2	11.2	11	8.6
Biochemical Oxygen Demand	mg/l	0.4	0.8	0.8	0.8
pH	mg/l	8	7.5	7.5	7.4
Alkalinity	mg/l	40	65	96	91
Acidity	mg/l	3	4	2	4
Solids - Dissolved	mg/l	116	140	144	142
Total	mg/l	124	164	156	174
Ammonia as N - Dissolved	mg/l	0.04	0.04	0.02	0.2
Total	mg/l	0.04	0.04	0.04	0.23
Nitrite as N - Dissolved	mg/l	0.01	0.02	0.02	0.07
Total	mg/l	0.01	0.02	0.02	0.07
Nitrate as N - Dissolved	mg/l	5.07	6.51	6.76	4.77
Total	mg/l	5.07	6.51	6.76	5.01
Kjeldahl as N - Dissolved	mg/l	0.24	0.28	0.38	0.6
Total	mg/l	0.3	0.3	0.61	0.82
Phosphorus - Dissolved	mg/l	0.04	0.05	0.03	0.06
Total	mg/l	0.05	0.09	0.07	0.13
Orthophosphate as P - Dissolved	mg/l	0.025	0.049	0.003	0.041
Total	mg/l	0.026	0.059	0.006	0.055
Total Organic Carbon	mg/l	2.8	3.9	2.4	4.3
Magnesium - Total	mg/l	8.66	9.01	8.08	10.3
Chloride - Total	mg/l	14	14	14	13
Sulfate - Total	mg/l	23	18	26	21
Turbidity	NTU	1.26	3.7	2.5	12.6
Iron - Dissolved	ug/l	100	100	100	100
Total	ug/l	110	339	442	100
Manganese - Dissolved	ug/l	50	50	50	50
Total	ug/l	50	50	62	50
Aluminum - Dissolved	ug/l	150	150	150	209
Total	ug/l	150	207	356	150
WATER-QUALITY INDEX		38	54	48	64

TABLE A13.--Water-quality data for Ebaughs Creek at Stewartstown, Pa.

Parameter	Unit	10/09/90 11:20	12/17/90 10:00	04/15/91 11:00	06/18/91 10:30
Discharge	cfs	4.15	0.753	10.44	6.78
Temperature	°Celsius	17	5	7.8	17.9
Conductivity	umhos/cm	175	270	292	178
Dissolved Oxygen	mg/l	9.5	12.4	11.2	8.7
Biochemical Oxygen Demand	mg/l	0.8	1.2	0.4	0.8
pH	mg/l	6.9	6.79	7.28	6.95
Alkalinity	mg/l	28	21	76	68
Acidity	mg/l	5	4	8	7
Solids - Dissolved	mg/l	104	96	192	118
Total	mg/l	110	116	196	146
Ammonia as N - Dissolved	mg/l	0.02	0.07	0.04	0.06
Total	mg/l	0.02	0.07	0.04	0.06
Nitrite as N - Dissolved	mg/l	0.012	0.016	0.02	0.018
Total	mg/l	0.012	0.016	0.02	0.02
Nitrate as N - Dissolved	mg/l	5.8	6.75	6.03	5.79
Total	mg/l	5.8	6.75	6.03	5.79
Kjeldahl as N - Dissolved	mg/l	0.2	0.2	0.2	0.25
Total	mg/l	0.2	0.2	0.2	0.44
Phosphorus - Dissolved	mg/l	0.05	0.02	0.03	0.03
Total	mg/l	0.05	0.02	0.04	0.07
Orthophosphate as P - Dissolved	mg/l	0.023	0.002	0.005	0.014
Total	mg/l	0.026	0.003	0.006	0.015
Total Organic Carbon	mg/l	1	1.3	1.5	2.2
Magnesium - Total	mg/l	5.05	4.83	4.86	7.02
Chloride - Total	mg/l	14	20	57	13
Sulfate - Total	mg/l	10	15	10	10
Turbidity	NTU	2.7	1.88	1.7	3.3
Iron - Dissolved	ug/l	124	76	99	115
Total	ug/l	288	168	234	1,450
Manganese - Dissolved	ug/l	48	42	37	71
Total	ug/l	49	42	40	118
Aluminum - Dissolved	ug/l	135	135	135	135
Total	ug/l	135	262	160	760*
WATER-QUALITY INDEX		27	31	34	49

* Values exceed water-quality standards.

TABLE A14.--Water-quality data for Deer Creek at Gorsuch Mills, Md.

Parameter	Unit	10/09/90 10:10	12/17/90 8:40	04/15/91 9:30	06/18/91 9:20
Discharge	cfs	10.86	14.37	19.09	10
Temperature	°Celsius	16.5	4.5	8.1	19.5
Conductivity	umhos/cm	198	290	160	180
Dissolved Oxygen	mg/l	9.3	12.3	10.3	8.5
Biochemical Oxygen Demand	mg/l	1.6	1.2	0.4	1.2
pH	mg/l	7.1	7.65	7.81	7.55
Alkalinity	mg/l	44	31	76	85
Acidity	mg/l	12	6	4	6
Solids - Dissolved	mg/l	126	100	104	104
Total	mg/l	142	100	110	140
Ammonia as N - Dissolved	mg/l	0.02	0.02	0.04	0.06
Total	mg/l	0.02	0.02	0.04	0.06
Nitrite as N - Dissolved	mg/l	0.012	0.004	0.01	0.02
Total	mg/l	0.012	0.004	0.01	0.02
Nitrate as N - Dissolved	mg/l	4.6	2.9	4.74	4.07
Total	mg/l	4.6	2.9	4.74	4.07
Kjeldahl as N - Dissolved	mg/l	0.2	0.2	0.2	0.5
Total	mg/l	0.39	0.2	0.2	0.56
Phosphorus - Dissolved	mg/l	0.03	0.02	0.02	0.03
Total	mg/l	0.05	0.02	0.03	0.08
Orthophosphate as P - Dissolved	mg/l	0.003	0.002	0.002	0.011
Total	mg/l	0.009	0.003	0.005	0.023
Total Organic Carbon	mg/l	1	1.3	1.8	2.5
Magnesium - Total	mg/l	6.31	5.17	5.08	5.86
Chloride - Total	mg/l	18	15	15	15
Sulfate - Total	mg/l	10	10	12	10
Turbidity	NTU	14.3	2.1	1.9	4.5
Iron - Dissolved	ug/l	66	57	82	64
Total	ug/l	797	158	238	821
Manganese - Dissolved	ug/l	35	44	33	29
Total	ug/l	60	44	33	55
Aluminum - Dissolved	ug/l	135	135	135	10
Total	ug/l	463	197	135	489
WATER-QUALITY INDEX		37	17	18	47

TABLE A15.--Water-quality data for Susquehanna River at Conowingo, Md.

Parameter	Unit	10/10/90 11:00	12/17/90 13:00	04/15/91 11:45	06/18/91 14:00
Discharge	cfs	4,325	52,440	68,610	6,396
Temperature	°Celsius	20	5	13.8	25.8
Conductivity	umhos/cm	270	230	210	260
Dissolved Oxygen	mg/l	6.5	5.3	9.6	5.6
Biochemical Oxygen Demand	mg/l	0.8	0.8	1.5	1.2
pH	mg/l	6.8	7.9	7.9	7.1
Alkalinity	mg/l	45	38	103	130
Acidity	mg/l	8	11	4	12
Solids - Dissolved	mg/l	150	104	140	200
Total	mg/l	174	124	140	218
Ammonia as N - Dissolved	mg/l	0.2	0.07	0.05	0.09
Total	mg/l	0.2	0.07	0.05	0.09
Nitrite as N - Dissolved	mg/l	0.026	0.008	0.012	0.25
Total	mg/l	0.03	0.01	0.012	0.29
Nitrate as N - Dissolved	mg/l	0.89	1.45	1.22	1.36
Total	mg/l	0.92	1.46	1.22	1.03
Kjeldahl as N - Dissolved	mg/l	0.52	0.2	0.26	0.25
Total	mg/l	0.63	0.2	0.42	0.27
Phosphorus - Dissolved	mg/l	0.03	0.02	0.02	0.02
Total	mg/l	0.05	0.03	0.05	0.05
Orthophosphate as P - Dissolved	mg/l	0.002	0.002	0.002	0.002
Total	mg/l	0.011	0.015	0.009	0.009
Total Organic Carbon	mg/l	2.5	2.5	2	2.5
Magnesium - Total	mg/l	7.76	5.3	5.67	9.75
Chloride - Total	mg/l	14	10	12	16
Sulfate - Total	mg/l	59	33	40	49
Turbidity	NTU	12.1	6.3	4.8	3.2
Iron - Dissolved	ug/l	10	103	28	11
Total	ug/l	300	471	561	397
Manganese - Dissolved	ug/l	119	112	10	108
Total	ug/l	229	141	186	256
Aluminum - Dissolved	ug/l	135	135	135	135
Total	ug/l	135	418	374	303
WATER-QUALITY INDEX		48	36	36	53

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SUSQUEHANNA RIVER BASIN COMMISSION

DEC. 24, 1970

N.Y.

PA.

MD.

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